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ABSTRACT

The first in the Asian series on experiments and innovations in education, this study describes the historical background generating the present Singapore education system and provides a detailed report on reform and changes introduced in the past ten years. Innovations have occurred in curriculum development where secondary education received more flexibility, a broader subject-matter base, fewer exams, and increased extra-curricular activities. An unplanned, unsystematic teacher education program was structured into a planned curriculum with behavioral objectives to develop professional competence. Innovation in the integration policy brought two languages into one common curriculum. Other areas of innovation include the development of educational technology, expansion of secondary technical training, and the development of educational research. The characteristics of change in Singapore are seen in purposefulness, connectedness, and pragmatism progressing through four stages of initiation, interpretation, implementation, and correction. (Author/DW)

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Experiments and innovations in education No. 9

Asian series

Educational innovation in Singapore

by Ruth H.K. Wong

Director
Institute of Education
(Singapore)

Study prepared
for the Asian Centre
of Educational Innovation
for Development

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Preface

In the spring of 1973 the IBE, in the framework of its programme of studying how change takes place in education, organized a seminar on innovation. The group was composed of the IBE permanent panel of consultants, and a number of research workers in the field of innovation from five Asian countries (India, Iran, Republic of Korea, Pakistan, Republic of Singapore) as well as from Canada, Cuba, France, Switzerland, the UK and the USA. In addition to the case studies commissioned by the Bureau, the seminar had before it five national studies (India, Indonesia, Iran, Korea, Singapore) of educational innovations prepared by research workers in these countries at the request of the Unesco Regional Office for Education in Asia (Bangkok).

The purpose of these studies cannot be better defined than in the words of the Director of the Regional Office:'...the studies are of a kind to stimulate innovation in the various countries of Asia because the necessity for reform is common to all the education systems of these countries...Whether it is a question of ex-colonial countries or of countries which have never been colonized, the need for change arises from the excessive influence exerted over the last century by the colonial powers ... Furthermore, the innovations in the Asian countries are of a radical nature. They affect the whole education system and the implantation of new structures is common to all of them. One of the essential aims of these national inventories is to bring out the similarities in the diverse innovations.'

The IBE believes this is a valid reason for publishing these inventories in its series *Experiments and innovations in education* and further for establishing within the collection an *Asian series* - this also in the hope that in the near future it will be possible to create similar regional series serving the other areas of the world.

The first of these studies to be published has been prepared by Dr. Ruth H.K. Wong, Director, Institute of Education (Singapore). It describes the historical background to the present education system in Singapore and provides a detailed report on the reforms

and changes that have been introduced during the past decade. The Secretariat wishes to record its gratitude to the author for undertaking this important work.

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I. A historical introduction

In order to appreciate fully the importance of educational changes in Singapore during the past decade, it is necessary to go back to the year immediately following World War II. For it was in 1946 that the period began from whose particular set of events and general climate of change arose the impetus for educational innovation, which has continued ever since.

Singapore's recent history of educational innovation may be described as one great innovative effort, embodied in the Education Ordinance of 1957, followed by various innovative acts and programmes deriving logically from it. It was this Ordinance which provided the springboard for translating intent into action. Thus, the years before and after 1957 may be classified for the purposes of this study into three periods: (i) the period of conflict resolution, 1946-56; (ii) the period of dynamic action, 1959-68; (iii) the period of qualitative consolidation, 1969 onwards.

The study of educational innovation in Singapore will concentrate on the last two periods.

The period of conflict resolution: 1946-56

Until the Japanese occupation of Singapore, the British Government had mainly focused on English and Malay schools, leaving Chinese and Tamil schools to the responsibility of private enterprise.

Thus, under the pre-World War II British Government there was hardly any attempt to achieve an integrated system of education with common goals and objectives, much less to create a common identity among the children in the various schools.

The Japanese, despite the upheaval and disruption which they caused, introduced certain educational measures which afforded the local people some fresh insights into the purpose of education and into their own educational needs. They compelled all schoolchildren to attend a daily flag-raising ceremony, followed by physical fitness exercises. Common youth activities were zealously promoted

and teachers of all streams of education were regarded as belonging to a common service. For the first time, teachers of English schools met and worked with those from Malay, Chinese and Tamil schools. The Japanese also forced integration through the use of a common language, Nippon-go.

The Japanese left in August 1945 and in July 1946 Singapore became a separate colony independent of the rest of Malaya. The immediate post-war years were characterized by educational rehabilitation and an unprecedented explosion of aspiration. Great pressure was exerted on English schools in particular to extend admission to all those who had been educationally deprived during the past three and a half years or had come of school age. There was also a growing demand for a local perspective on education. Hence, towards the end of 1947, after nearly a year of thought and planning the 'Ten-year Programme for Education Policy in the Colony of Singapore' was accepted by the Advisory Council as a working document.

The main principles and goals underlying this plan anticipated somewhat those embodied later in the White Paper on Education (1956) and the Education Ordinance (1957). These were:

(a) that there should be equality of educational opportunity for all children irrespective of sex, race and religion;

(b) that, upon a basis of free universal primary education, there was to be developed such secondary, vocational and higher education as would meet the needs of the country;

(c) that education should aim at fostering a sense of common identity, the ideal of civic loyalty and responsibility and thus extend the capacity for self-government.

In keeping with the first principle, a target was set to provide six years of free universal primary education in the mother tongue in Chinese, Malay and Tamil schools. This goal remained largely unrealized for various reasons.

First, means available at the time could not support the intentions announced in the Ten-Year Plan and reiterated in a Five-Year Plan, urging the Government to allocate to education a proportion of the Colony's resources 'more in accord with that in Great Britain'. At the time, the allocation was only five per cent of the national budget, very much below what it is to-day. Thus on a slim budget, and with the considerable post-war reconstructive work and new demands which had to be met, free primary education could be implemented only for the English stream of education and that not until 1949. The Government tried to assist Chinese and Tamil

schools which had been largely private, by extending the system of per capita grants and increasing the transfer of such schools from the per capita to the grant-in-aid scheme.

Secondly, while enrolment in all language streams was, by the definition of equality, to be largely determined by parental choice, the Government's initial actions seemed to indicate a strong preference for the English stream schools over which it retained control. Fees, when chargeable, were lower in English schools than in the non-English streams. Again, though it had been stipulated initially that only children who came from English-speaking homes could be admitted to English schools, the condition was soon waived under pressure from the non-official members of the Advisory Council. Furthermore, a special provision was made for pupils to transfer from non-English to English schools in the third year of primary school. This preference for the English language and English schools caused considerable resentment, particularly among the Chinese.

It is true that the Government stated the need to concern itself with Chinese and Tamil education. But so long as its interest was not demonstrated by new concrete measures, such schools would necessarily decline and the difficulties in developing a sense of civic loyalty and responsibility would be multiplied.

Moreover, these concrete measures required more than the extension of the existing grant systems since to make all schools 'regional' rather than 'racial', to bring about the intermingling of pupils of all races would require a total change in the nature of Chinese and Tamil schools.

It is also true that the plan provided for the teaching of English as second language from the third year in non-English schools, but setting aside one-third of curriculum time for this purpose was unacceptable to Chinese schools.

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1. The grant-in-aid scheme provided not only for per capita payments on the basis of enrolment, but also for teachers' salaries with allowances, etc. similar to those for teachers in government schools, besides superannuation benefits arranged under a provident fund scheme.
2. Supplementary Five-Year Plan, 1950.

In an attempt to meet the growing demand for education and to put teacher-training on a more organized basis, a teachers' training college was established in 1950. But here again, supply lagged behind demand and, for a long time, Tamil and Chinese teachers remained without college training. Another problem was the lack of suitable supervisors of the curriculum and activities of Chinese and Tamil schools (only English and Malay schools had received consistent guidance and supervision). Thus from every standpoint, parity of treatment for all streams of education was difficult to effect.

The second principle (developing secondary and tertiary education to meet the needs of the country) involved similar problems of inadequate resources and unready attitudes. Also a sizeable portion of the budget had to be spent on primary education to make good the promise of free universal primary education. So long as this target was not evenly achieved for all linguistic and ethnic groups, it was difficult to expand education at other levels, although certain priorities could be maintained. Between 1947 and 1957, post-school certificate classes (currently known as pre-university classes) were nevertheless established in selected secondary schools, and a government commercial school and junior technical school were set up. These measures and the introduction of general and domestic science into the curriculum marked the beginnings of an attempt to improve secondary education through diversification of its content. Also, in 1949, the two colleges —the Raffles College with its Arts and Science Faculties and the King Edward VII Medical School— were amalgamated into a degree-granting university, the University of Malaya.

The third principle, namely, that education should aim at fostering a sense of common identity, the ideal of civic loyalty and responsibility was somewhat furthered by the establishment of a Department of Oriental Studies at the University, followed by Departments of Chinese and Indian Studies. At the school level, however, the enrolment of pupils at Chinese, Tamil and Malay schools was left very much as before the Plan, with each non-English linguistic stream preserving its uni-ethnic character, insulated against the multi-racial mix evident only in English schools.

The failure to integrate Chinese schools[3] within the education system was soon made evident by the Chinese student unrest in the early fifties. The All-Party Committee nominated in 1955 to examine the problems of Chinese education, attributed them to two sets of causes — 'the first, those which could be accounted for by the historical development of the Chinese school system and the second, the exploitation of the dissatisfaction and frustration to which the system had given rise'.

The outcome of this study was a set of recommendations embodied in a White Paper on Education Policy (1956) detailing how equality of educational opportunity and the forging of a common identity might be achieved. These recommendations may be summarized as follows.

In support of the principle of *equality of opportunity:* equal treatment for the four language streams of education — Malay, Chinese, Tamil, English; equality of grants, conditions of service and salary to be extended to all schools — government and government aided; common curricula and syllabuses to be prescribed for all schools; free transfer of language teachers between streams according to need; steps should be taken to remove the causes of frustration felt by the Chinese community and Chinese schools due to discrimination against such schools in the past.

In support of the principle of *forging a common identity:* increasing use of textbooks with local relevance; encouragement of intermingling pupils from the various linguistic streams through sports and extra-curricular activities; teaching of civics to be made compulsory in all schools and the teaching of ethics to be introduced; every attempt was to be made to fuse the best elements of the various cultures of the main ethnic groups; bilingual education at primary and trilingual education at secondary level was to be implemented in all four streams.

To ensure that these recommendations would be properly effected within a unified system of national education, two immediate steps were taken, namely, the passing of a single Education Ordinance in 1957 to apply to all schools and the passing of the Grant-in-Aid Regulations, whereby the full grant-in-aid system was extended to all schools satisfying prescribed conditions on the proper operation of a school. These measures ensured parity of treatment for all schools, whether government or aided, irrespective of language

3. There were fewer problems with Tamil schools, which were scarcer and considerably less attended than Chinese schools.

medium (excepting certain different privileges retained by government and aided schools). Also supervision and control of staff, curriculum content and management were thereby facilitated.

Thus ended the first post-war decade, a period which had witnessed a series of conflicts — conflicts of new needs, goals and aspirations with outdated systems, attitudes and methods of accommodation. Such recommendations as were embodied in the White Paper (1956) and the Education Ordinance of 1957 indicated an effort to resolve the basic issues of conflict but the solutions would only take shape in the ensuing years.

The interim years: 1957-59

In the years between 1957 and 1959 certain significant events occurred. An intensive school building programme was initiated and to meet the growing demand, double-session schooling was inaugurated in 1957. Singapore Polytechnic was established in 1958. The University of Malaya expanded into two two divisions in 1958, one in Kuala Lumpur and the other — the mother institution — remaining in Singapore. The great demand for adult education was recognized by the provision of grants totalling some half a million dollars by the Government to the Singapore Council of Adult Education.

It remained, however, for the emergence of a business-like government, such as the People's Action Party (PAP) to give true and meaningful substance to the intended reforms and objectives embodied in the Education Ordinance. Educational renovation and innovation cannot occur in a vacuum. If, in the community and nation, problems and conflicts remain unresolved, changes in the education system are likely to flounder in a morass of uncertainty.

The period of dynamic action: 1959-68

In 1959, an eventful year, Singapore gained complete internal self-government. The newly elected PAP took office in June and soon made it clear that its approach to educational problems would be to consider them in relation to political and social needs. The new educational policy already announced during the election campaign had a three-fold aim: (i) equal treatment for the four streams of education: Malay, Chinese, Tamil and English; (ii) the establishment of Malay as the national language of the new State; (iii) emphasis on the study of mathematics, science and technical subjects.

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The rationale for this three-fold aim was given fully in the Education Report of 1959.[4] I quote:

'In a self-governing country which must give equal treatment to its citizens, equal opportunity means freedom of choice of the medium of instruction for the citizens' children, whether it be Malay, Chinese, Tamil or English. Having made this choice, the parent is assured that the standards aimed at are the same in all schools, both Government and Government aided, with common curriculum and syllabuses, with teachers trained in the Government Teachers' Training College and the same degree of supervision exercised by the Inspectorate of the Ministry.

'To act as a bridge to span simultaneously the four streams of education and to unify a community composed of different races, exposed to communal suspicion and prejudices, the setting up of one national language is vital. A common link for undivided loyalty to one another and to the State is provided in the National Language.

'The third base of the Government's education policy is designed to equip the youth of the State with requisite skills, aptitudes and attitudes for employment in industry. The economy of the State can no longer be sustained by entrepot trade alone. In the re-orientation of the economic policy of the State, industrialisation is vital. Industrialisation is the key to survival. To increase industrial productivity, potential skill must be trained. So a start in developing the latent skills must be made in the schools. The new education policy would ensure that students have increased facilities for training as craftsmen, technicians, scientists and engineers.'

In order to realize these aims, the new Minister for Education took certain important measures. First, he ensured that the school building programme, which was temporarily frozen in 1959 in order to enable the Government to ascertain the true state of the economy, would thereafter continue with the greatest possible speed. School buildings were erected during the decade at the approximate rate of a building per month, the most rapid expansion occurring between the years 1962-67.

Secondly, he set up the Educational Advisory Council in November 1959 with the specific brief to 'advise him on any matter of educational policy or development which may be referred

4. Singapore. Ministry of Education. *Annual report, 1959*. Government Printing Office, 1961, p. 1.

to it by the Minister'.[5] This Council had a wide representation covering the various tertiary institutions, teachers' organizations, the Ministries of Health and Social Welfare. Standing committees were formed to assist the Council in its functions, the main ones being the Committee on Syllabuses and Textbooks, the Committee on Science, Vocational and Technical Education and the Committee on Physical Education.

Thirdly, the Malay Advisory Committee was appointed by the Minister in the same year to advise him on matters relating to Malay education.

This new education policy and the actions which followed strongly outlined the significance of the principles of parity, unity and relevance to needs which had been foreshadowed in the Ten-Year Plan of 1947 and the White Paper on Education in 1956.

During this decade, the pace of change accelerated. These were the years of purposeful direction and significant improvements in educational opportunity. Suffice it to mention briefly a few of the highlights, since the details with other associated measures will be discussed more analytically in chapter three onwards.

Equality. The principle of parity was given the widest possible interpretation to cover every aspect of schooling. Quantitatively, at least the goal of equality of educational opportunity was fully achieved. Although, in the first years (1960-1962), free primary education was accorded only to qualified pupils of the correct age for their classes, after 1963 it encompassed all children in the correct age group (6-8 years) at the time of admission, so long as they were born in Singapore or were children of Singapore citizens. Thus, well before the end of the decade, free universal primary education for six years was realized in Singapore. Parental choice determined admission to a school belonging to any one of four language streams.

In 1961, new common syllabuses for all traditional school subjects were published in the four language-media; the syllabus committees of the Textbook and Syllabuses Committee also reviewed a number of school texts and drew up the first list of books recommended for use in schools. By 1964 common syllabuses were also available in the newer technical subjects taught at secondary level and the opportunity for diverse preparation at secondary level was thus within the reach of pupils in all streams of

5. Ibid., p. 2.

education.

Harmonization of benefits also occurred in the area of physical facilities, in the provision of teaching and supervisory staff and in the stipulation of common expectations with respect to the output of schools. A vigorously pursued building programme provided standardized primary and secondary school buildings. To meet the need generated by application of the principle of equality, the Teachers' Training College began training in the four different languages and provided preparation for teachers of technical and special subjects. Faced with unprecedented quantitative pressures, the programme at the college became exclusively part-time. Teachers-in-training, as the students were called, attended lectures at the college in the mornings and taught in schools in the afternoons, or vice versa. Through such measures the supply of teachers for primary schools managed to catch up with demand by 1968.

Also during this period, the qualifications of school leavers from Chinese schools were matched to those of pupils from English schools by aligning the old Chinese educational structure (6 years of primary school, 3 years of junior middle school and 3 years of senior high school) with the English system (6 years of primary school, 4 years of secondary school and 2 years of pre-university education). This meant that all school leavers who did not attend university had a uniform ten years of education in school. Common examinations, the PSLE (Primary School Leaving Examination), the SCE (School Certificate Examination) and the HSC (Higher School Certificate Examinations) were also instituted for all streams, with the Malay and Tamil stream pupils having their first School Certificate examinations in 1963.

Equality between the sexes was also given attention. All newly established schools were co-educational and admission to each further stage of education was strictly by merit. Early in 1962, the Government accorded women teachers equal pay with their colleagues and promotion opportunities in the education service became equally open to women and men.

Racial and socio-economic discrimination were also reduced in 1959 by the government scheme for the loan of free textbooks, which had previously been available only to English schools. This ensured that no needy child would be denied education because of race or inability to meet the cost of textbooks. The budget for the textbook loan scheme almost quadrupled during the period: a

dramatic increase when compared with the 70 per cent rise in total school population over the same period. Generous bursaries and scholarships were also offered at secondary and higher levels, and an important step was taken to provide Malays, the most economically disadvantaged group, with free tuition up to university level.

Unity. A primary concern of the PAP Government right from the beginning has been that the three main ethnic groups comprising Singapore's population should be not only tolerant of one another but should also become a cohesive whole. In the words of a former Minister of Education: 'Our ability to survive and prosper as individuals depends on our ability to survive as a nation and on our readiness to promote the collective interests of our people as a whole'. This concern was pursued assiduously in all areas of society and, more particularly, in schools which necessarily prepare citizens of the future.

Each morning, at the flag-raising ceremony, pupils repeat the pledge, 'We the citizens of Singapore, pledge ourselves as one united people, regardless of race, language or religion, to build a democratic society based on justice and equality so as to achieve happiness, prosperity and progress for our nation'.

But verbal expression had to be supported by active implementation. To achieve social cohesion through education, the Ministry of Education adopted the policy of integrating two or more language streams, where possible, within a single school under a common principal. The specific aim was to afford opportunities for joint participation in sports and extra-curricular activities which in their turn would help to promote better understanding between pupils of different streams. All schools built during the 1959-1968 period were integrated schools.

On a national basis, too, special annual activities were planned largely to foster a sense of friendly, keen competition, togetherness, loyalty and ruggedness and 'to break down communal barriers by encouraging schools of different language media to take part in joint activities'.[6] The best known and most carefully planned activities are the annual Singapore Youth Festival, the National Day Parade and Celebrations, the interschool Arts

6. Singapore. Ministry of Education. *Progress in education*, Singapore Teachers' Organisations, November 1966, p. 14.

and Crafts Exhibitions, National Athletics and Games Championships, the Young Musicians' Society and the National Cadet Movement.

Understanding between the pupils of Singapore is also encouraged through certain curricular requirements. Bilingualism is specifically required of all pupils, and an increasing number of school leavers is thus at least capable of communicating in a second language. The study of civics was made compulsory from the start and history textbooks for use at primary level were re-written to introduce a local content.

These efforts to foster a national identity have had encouraging results. As Singapore faced the 70s, the Prime Minister was able to claim before members of the Government Party, 'From an inchoate, disorganized, disparate group of diverse, racial, clannish, linguistic and dialect groups, further fragmented by different groups, we have become a more tightly-knit society. There is now a consciousness that our personal interests rest on our national interest. From a riotous, volatile, unstable, unpredictable society, we have become stable and predictable, politically and economically'. Though the Prime Minister was referring to the nation as a whole, this description is certainly true of the young people in the schools.

Relevance. A PAP pamphlet, published in September 1971, claimed that 'through our democratic socialist policies, our programmes have transformed Singapore's traditional entrepot economy into a competitive, industrialised one, established Singapore as an international financial centre, made our port the fourth busiest in the world, uplifted standards of living ...' and, indeed, Singapore's economic success and industrial progress have been frequently noted by economists, visiting experts and the local press.

Since the quality of the labour force has made such a situation possible, we may assume that education in Singapore over the past decade has been relevant to the social and economic needs of the nation, including the need to expand the economy through a programme of industrialization.

From the beginning, the Government declared its intention to emphasize the study of mathematics, science and technical subjects. In 1960 a team was sent to study the system of vocational and technical education in Israel and in early 1961 a Commission of Inquiry into Vocational and Technical Education was appointed.

As a result of its recommendations and findings published in 1961, the secondary school system was restructured so that besides academic schools a more technically-oriented system was made available through: (a) secondary vocational schools, offering a two-year vocational-type course for those who fell below the standard required in the Primary School Leaving Examination; (b) secondary technical schools, to provide education with a technical bias leading to post-secondary education as well as direct entry to industry; (c) secondary commercial schools, to provide a two-year commercially biased programme after two years of general secondary education; (d) vocational institutes, to provide industrial training at trade and artisan levels (one of these, subsequently established, specializes in manual and applied arts).

Since social attitudes did not easily accept the blue-collar concept, a major effort had to be made to provide enough manpower for industry's needs. To ensure speed and co-ordination, the National Industrial Training Council, comprising the Ministers of Education, Finance and Labour, was formed in 1968. It was responsible for general policy relating to technical education and industrial training in Singapore. In the same year the Ministry of Education became two major divisions——the General Education Division and the Technical Education Division. Also all secondary school pupils, (excepting 50 per cent of the girls, who were assigned to the study of home science) entered secondary schools for a two-year course comprising both technical and academic subjects. Centralized workshops set up in various districts provided practical experience.

At the tertiary level, the Sirgapore Polytechnic was greatly expanded and the Ngee Ann Technical College, which formerly trained only Chinese-stream post-HSC students in arts and commercial courses, was also converted into a polytechnic type of institution. The departments of engineering and business administration were given priority in planning expansion programmes at the Singapore University. New subjects, such as urban planning, architecture and industrial chemistry helped to diversify the choice of a vocation at tertiary level.

To provide the necessary teachers to cope with the new bias towards technical education, a comprehensive training and retraining scheme was introduced in 1969. Certain required facilities were provided at the polytechnic and, in 1968, plans were made for the addition of a fully equipped technical wing to the

Teachers' Training College.

Considerations of relevance often require planning beyond the formal school system, as did, in Singapore, the educational programmes connected with the activities of the People's Association.

Before the PAP Government took office there were some 28 community centres operating variously under the Social Welfare Department, Rural Development Department and the Singapore Improvement Trust. There was no unified policy, co-ordinated purpose or central leadership. In July 1960 the People's Association (PA) was established by ordinance and the community centres were placed under its direction. From experience gained in its brief, initial, turbulent period, when the right for control was contested in the face of Barisan Socialist opposition, the Association realized the need for constant contact with the local people and, particularly, the need for sustained communication with people in the rural areas. An ambiticus programme therefore began to establish community centres in rural areas and a permanent staff of liaison officers was employed to maintain contact between the organization and the local residents.

Field and organizational studies of the PA's work suggested the desirability of supervising the community centres by setting up management committees under local leadership since 'local leaders were in a better position to encourage and inspire local community participation in the programmes of activities'.[7]

Though the purpose of community centre programmes is largely cultural, they have become increasingly involved with pre-school and non-formal aspects of education. In Singapore, there are, as yet, no government-subsidized pre-school programmes, and this means that poorer children tend to miss the benefits of education in the pre-school years. It was therefore both through necessity and circumstance that the PA instituted its first training course for kindergarten teachers. The course was taught by a specialist inspector from the Ministry of Education and two trained teachers were also sent abroad for a nine-month course in kindergarten organization and techniques of teaching. With their return, the kindergarten programme was expanded rapidly, as they trained teachers and supervisory staff at both initial and advanced levels. The Ministry of Education also assisted

7. *People's Association, 1960-65*. Singapore, p. 15 [English version]

from time to time. The popularity of the PA kindergartens may be gauged by the rise of the number of pupils from 1,351 in early 1960 to 11,190 at the end of 1968.

The PA also developed vocational courses which became very popular, particularly among the women. Also a National Youth Leadership Training Institute was set up in 1964 to give leadership training for the administrative secretaries at the various centres and for those participating in youth movements. Not only does this Institute offer a regular training programme, it also conducts week-end seminars on youth, education, current international issues, and the like.

Another non-formal area of education which the Government put on a firm basis was adult education. Before 1959, adult education was exclusively handled by an ad hoc Singapore Council for Adult Education with financial assistance from public funds. In April 1960 the Lembaga Gerakan Pelajaran Dewasa Ordinance set up a new statutory authority for planning, regulating and implementing adult education in the State, and the functions and assets of the old Council were taken over by the Board.

At first, the Board's main contribution was in the field of basic education, for example setting up centres to study the national language in furtherance of the new Government's expressed aim. More recently, it has extended its activities into the area of further education and has offered commercial, technical and general education courses in secondary and pre-university classes, but an important area of attention has continued to be the teaching of local and foreign languages.

The Department of Extra-Mural Studies of the University of Singapore has also been engaged in similar non-formal activities since 1964 with a greatly extended scope during the half decade from 1965-69.

The PA's education programme coupled with those of the Adult Education Board and the Extra-Mural Studies Department of the University (all begun in the early 60's) form a tripartite arrangement whose members complement not only one another but also the formal education system, although they were separately conceived and were not specifically planned with this in view.

The PA's programme emphasizes the needs of pre-school children, simple vocational training, especially for women, and basic education with respect to health and social responsibilities such as family planning, harmonious and gracious living, keeping

Singapore clean and the like. It seeks to bring people of all walks of life together into a common purpose through education.

The Adult Education Board provides educational opportunities for youthful learners who, for one reason or another, have dropped out of formal schooling. Its courses provide improved vocational opportunity and orientation for those who have missed the chance to develop academically. The Extra-Mural Studies Department of the University (while it overlaps with the Adult Education Board in purpose) has developed in the direction of continuing education. Its wide variety of courses indicates a healthy concern for the increasing interest of Singapore's citizens in being perpetual learners in a rapidly changing society.

Finally, an important non-formal educational service, inaugurated in 1967, is the Educational Television Service controlled by the Ministry of Education, with programmes telecast to schools by the Broadcasting Department of the Ministry of Culture. The function of this department has developed a three-fold purpose. First, its programmes are directed to those curriculum subjects for which there is a lack of specialist teachers. Next, its programmes exemplify approaches and teaching methods recommended with the introduction of the new school curriculum in 1971. Thirdly, it is responsible for preparing enrichment 'packages' for pupils at different levels of school. Within a five-year period, the ETV Division has developed from a modest service for the telecasting of lessons to one which provides a strong foundation for school teaching. All ETV programmes are multilingual with telecast in all four language media.

The period of qualitative consolidation: 1969 and into the 70s

By all counts, educational changes in the 60s were impressive. Nevertheless, they were mainly at the level of development rather than qualitative consolidation. As early as 1966, before the Development Decade was anywhere near its end, the Prime Minister noted the 'tremendous price'[8] which was being paid for educational expansion, not in financial terms but because expan-

8. Prime Minister, Mr. Lee Kuan Yew's speech at the opening of the Third Asian Teachers Seminar of the World Confederation of Organizations of the Teaching Profession (WCOTP), November 1966.

sion could not always be matched by qualitative considerations. However, on the threshold of the 70s Singapore was ready to consolidate the position which education had obtained. The quantitative pressure for school places at primary level had eased off considerably. Every child of the appropriate age could be admitted to instruction in the medium of his parents' choice. But schools were still running two sessions. Classrooms continued to be full and the population bulge at elementary level was steadily moving up to secondary level.

Furthermore, social trends frequently complicate the best of plans. One recent trend in Singapore is the increasing preference of parents for their children to receive education in the English language stream. This is due to another trend caused by rapid industrialization in Singapore, namely, the growing inter-relationship, which parents perceive, between proficiency in the English language, the consequent mastery of technical skills and a viable livelihood in a technological society.

This trend has disrupted the flow of teachers to the different language streams and has reintroduced a problem which seemed under control during the stable conditions at the end of the 60s. It has also increasingly emptied classrooms in non-English medium schools, raising the problems of how best to re-allocate the space thus vacated and (a more important issue), how to retrain those teachers who have become redundant through the change. However, these problems, when viewed against the needs which had to be met during the Development Decade, are minor and mainly concentrated in the area of teacher education.

The Government's resolve to turn its attention to qualitative improvements was marked by the Minister for Education's recent announcement concerning the establishment of the Institute of Education. While the Institute will continue to work closely with the Ministry, it will enjoy a new autonomous status which will enable it to develop new directions for its programmes more freely.

In other areas, too, significant beginnings have been made in qualitative terms. The work of the Research and Statistics Unit was strengthened by the appointment of a Director of Research. This unit is increasingly concerned with the continuous appraisal of educational organization and practice in the light of national and social objectives, the evaluation of teaching methods and curricula content and the careful examination of various problems of teaching and learning in order to upgrade

the quality of education. It also arranges seminars for teachers and principals to acquaint them with the implications of research for school practice.

With the setting up of the Institute of Education it is intended that the less ad hoc types of action research will be based in the Institute while the Research and Statistics Unit will revert to its former status and concern itself with the compilation of routine statistics and simple quantitative studies in research. Such statistics have also been put on a firmer basis through computerization. Data on the teaching force have been completely computerized. A further exercise, lasting four to five years, will likewise deal with the data on school pupils.

In September 1969, the Minister for Education set up the Advisory Committee on Curriculum Development under the chairmanship of the Director of Research. This committee undertook a re-examination of the goals, aims and objectives of education in Singapore. In 1970 new standing committees on curriculum development were appointed, superseding the old ones formed under the Educational Advisory Council of 1959, and differing from them in two respects—in their multilingual composition (the former ones were based on linguistic groupings) and in their approach to curriculum development. This, contrary to the traditional scissors-and-paste pattern, was henceforth to follow a continuous cycle of implementation, evaluation and improvement. So far curriculum revision has been completed for the first four years of primary school, with new syllabuses covering a two-year time span. This is to give teachers more flexibility in organizing the teaching of children who, in the primary school years, tend to vary much more in rates of learning than they do at secondary level.

Two of the new standing committees are strictly non-subject committees, namely, one on School Libraries and the other on Educational Technology. They are intended to examine the educational resources available and suggest how the objectives of the new curriculum can be fulfilled in the best possible way. Audio-visual facilities in schools are being gradually increased, and an instructional materials library established within the ETV Service lends films and filmstrips to schools. At the Resource Centre recently set up at the Training College, teachers are advised on teaching aids or encouraged to make them. Likewise, a specialist inspector in the audio-visual communications field

gives talks to school teachers and principals and personally advises on how each school may best equip itself to set up sound learning situations.

In the area of technical education, a module system of training was introduced in 1970, whereby students, with varying preparation and backgrounds, could undertake industrial training at stages appropriate to their knowledge and skills. Such training is now available at all industrial training centres and vocational institutes (excepting the Baharuddin Vocational Institute which specializes in manual and applied arts). Further progress in technical education was recently (1972) made with the establishment by Act of Government of the Industrial Training Board, to supervise all educational institutions with an industrial training component in their curriculum. The Board will help to interrelate the vocational training provided by the institutes and the industrial training provided within industries. Through having among its membership persons from the industrial and private sectors it will also enable the formal institutions to keep in better touch with the manpower and types of training required by industry.

Curriculum renewal has thus commenced in the various sectors of education (academic, technical and vocational) and at all levels (primary, secondary and tertiary). No doubt the substantial reorganization of courses will soon be completed, but the deeper issues belonging to the realm of human behaviour are much more difficult to attend to. Behaviour cannot be legislated into conformity, nor can a consensus on desirable values be wished into existence overnight.

For a country which has as one of its aims the building of a tight-knit, cohesive and gracious society, the tasks ahead are challenging in that qualitative considerations do not materialize as easily as quantitative plans. To examine, analyse and classify goals, aims and objectives is arduous and it may take some pains and patience preparing instruments to measure the desired quality of the output, but the task is not impossible. However, between the goals and the outcomes the variables are not easy to control or predict, and it is to this aspect of the system that much of the attention of this coming decade will be focused.

To provide a clear picture of qualitative aspirations for the next five years, it is pertinent to quote verbatim from the education addendum to the President's address at the opening of

Parliament soon after the PAP was returned again in the 1972 elections.

The Addendum to the President's Address

'The main emphasis in education is to improve the quality of teachers, teaching methods, and teaching curriculum.

2. Bilingual education

The second language will be better taught through improved methods, by teachers specially trained to teach the mother tongue as a second language in English schools, and English as a second language in non-English schools. More time is being devoted to this. All teachers will eventually have to be bilingual.

3. Curriculum development

Educational research and curriculum development will lead to a continuous re-evaluation and revision of curricula so that what is taught is relevant to the changing social and economic needs of the nation.

An Educational Media Service will be established to use the latest in teaching techniques and teaching aids.

The teaching of subjects will be more related and integrated to avoid compartmentalisation of knowledge.

More time for extra-curricular activities will be given, by reducing the classroom workload. The stress on extra-curricular activities will be encouraged especially in the cadet and other uniformed groups. They will be made more interesting by more varied activities like attachment to SAF and Police Units on exercises, and training camps during end of year holidays. School bands should improve with the return of several music teachers who have graduated from music academies in Britain and Australia.

Civics will be taught to foster social discipline and national identity, to develop in the students an appreciation of moral and cultural values, rather than learning, sometimes by rote, for scoring marks in examinations.

4. Technical education

The secondary school curriculum will have a technical bias. The aim is to provide the technically-inclined school leaver with sufficient grounding in the theoretical and practical aspects of technical education to better pursue either higher education or skilled technical/vocational careers.

5. Teacher training

The professional skills of both teachers and teacher-trainers will be improved. Teacher-training courses will be restructured. There will be more refresher courses to enable serving teachers to improve their teaching techniques and capabilities. There will be more opportunities for teachers who wish to improve their academic and professional qualifications locally or abroad on full pay or no pay leave as is appropriate in each case.

6. Staffing

As more qualified teachers become available, the teacher-student ratio will improve, reducing the number of student per class to provide more individual attention for each student.

The Ministry will recruit more suitable graduate teachers, particularly for subjects in which the shortage of teachers is acute. The ratio of graduate to non-graduate teachers will be improved in secondary schools.

Under the Restructured Education Service outstanding teachers will get rapid promotion. There will be more effective deployment of talent by considering individual aptitudes and interests of teachers when making postings.

7. Educative travel

Students and teachers will be given greater opportunities for educative travel to neighbouring countries through grants from the Education Fund.

8. School building programme

More and better-designed schools will be built in the new satellite towns and large housing estates. This will relieve the present shortage caused by the mass shifts in population to these areas in the last few years.

To encourage public participation in educational development more generous assistance will be given for

the establishment of new aided schools.

With more school buildings, the system of two intakes of Primary I children a year, at present available only in the Chinese stream, will be extended. More secondary schools will revert to single session.

Several more junior colleges, both government and government-aided, are being built. They will provide more students with centralised pre-university education along the lines of the National Junior College.

9. Tertiary education

The development and expansion of our tertiary institutions are proceeding as planned. The University of Singapore will complete the first phase of the development of its new Kent Ridge campus by 1975. Nanyang University is drawing up plans for their physical and academic improvement. The Singapore Polytechnic will completely move to its new campus at Dover Road. It will eventually expand to cater for 8,000 students. The Ngee Ann Technical College will develop and expand its facilities eventually to take in 3,000.

10. Industrial training

An Industrial Training Board will be established. This Board will co-ordinate and promote all forms of industrial skills training, both in education institutions and in industry itself.

A comprehensive range of Apprenticeship schemes is being worked out. Legislation to comprehensively regulate all Apprenticeship training will be introduced.

Special attention will be concentrated on the acquisition of precision skills in the manufacturing and engineering sectors. Meanwhile the Ministry will continue to develop vocational training in selected manual and applied arts and service trades.

A system of National Trade Tests will be established to achieve uniform standards in the level of industrial skills attained.

11. Education for the handicapped

It is proposed to set up a Special Education Unit to co-ordinate the efforts of the Government and voluntary organisations in vocational rehabilitation for various handicapped groups.

This Unit will help them adjust as much as is possible in their social and economic lives, and to enable them to lead useful lives.

13. Adult education

Adult education will be more closely linked with the school system on the one hand, and with industrial training on the other. Adult education is a continuation of school education for as long as our workers wish to improve themselves, whatever their age in life, whatever their standards.

Emphasis will be on off-the-job training to improve the technical competency of adult workers through part-time courses, special ad-hoc courses, and other specialised training.

The Adult Education Board's programme of recreational and enrichment courses will be expanded. They are to encourage the public to spend their leisure in more wholesome pursuits giving them more satisfaction through accomplishing something useful.

14. Private schools

In order to safeguard public interest regulations will be introduced for better control of private schools, correspondence schools and kindergartens.'

The characteristic precision, resolve and purpose which transformed the system of education over the past decade (see Charts 1 and 2 overleaf for comparison) are discernible also in these lines of the addendum.

Chart 2 shows how much the system has been harmonized in terms of requirements at the various institutions of higher learning. Whereas the Chinese stream student in 1961 had to offer a senior middle III qualification for admission into the polytechnic, his peer in the English stream was required to hold only a school certificate. The former spent twelve years in school; the latter ten. Examinations for the various streams were not standardized and school leavers from each stream sat for a differnt examination. In 1972, however, all school leavers took the Cambridge O-level examinations after ten years of schooling and those continuing for a further two years will take the common Cambridge A-level examinations.

Another notable change in the school system is the increased opportunity for mobility upwards. There are more tertiary institutions to-day than 10 years ago and the greater technical bias is also quite evident. The possibilities of achievement in higher education have thus been raised, particularly in the area of teacher training. The University of Singapore, Nanyang University and the Teachers' Training College are all engaged in the supervision of postgraduate as well as undergraduate work.

Flexibility has been added to the system with the alternatives of full-time or part-time training, allowing tertiary students to gain practical experience while undergoing professional or vocational training. Also, vocational schools which in 1961 catered to failures in the PSLE no longer exist and with their disappearance the stigma attached to vocational training has also been erased.

Moreover, pre-school education, while still an optional private enterprise, has become increasingly popular as Singapore society has become more affluent and sophisticated. Thus, in 1972, it was gauged that more than 60 per cent of children were receiving kindergarten training of some sort, either at private kindergartens, those of the People's Association, or at the PAP-sponsored ones.

In conclusion, therefore, it may be expected that, given the rapid progress made in the past decade and continued stability in the country, the end of the next period should not be less encouraging than what has been outlined hitherto.

PRIMARY
SECONDARY
TERTIARY
Years of schooling
Grades at each stage
Normal age in each gr.
Pre-school •
(age 4-5) Kindergarten Certificate
Primary School
(Primary School Leaving Certificate)
Secondary Academic
School Leaving Certificate (Academic)
Secondary Technical (only 4 schools)
School Certificate (tech')
Vocational Schools
For failures in the PSLE (Cert.)
Post-graduate Degrees
Hons Degree
Pass Degree
University of Malaya in Singapore
Pre-Univ. classes (English schools only)
Pass Degree only
Nanyang University
Senior Middle 2 and 3 (Chinese schools only)
Polytechnic
Dip.
Cert. Poly (E)••
Cert. Poly (C)•••
S. M. 2 and 3
Full-time
Part-time Certificate in Education
Teachers' Training College
Pass Degree grads.
Hons Degree grads.
Part-time Certificate in Education for graduates
Adult Education Board
Further education up to Pre-University I only
• Only a few kindergartens to be found. Most children entered school without pre-school experience.
Poly (E) : Polytechnic English stream (entry point : School Certificate)
••Poly (E) : Polytechnic English stream (entry point: School Certificate)
•••Poly (C) : Polytechnic Chinese stream (entry point: Senior Middle III)

Chart. 1. *Singapore's education system, 1961*

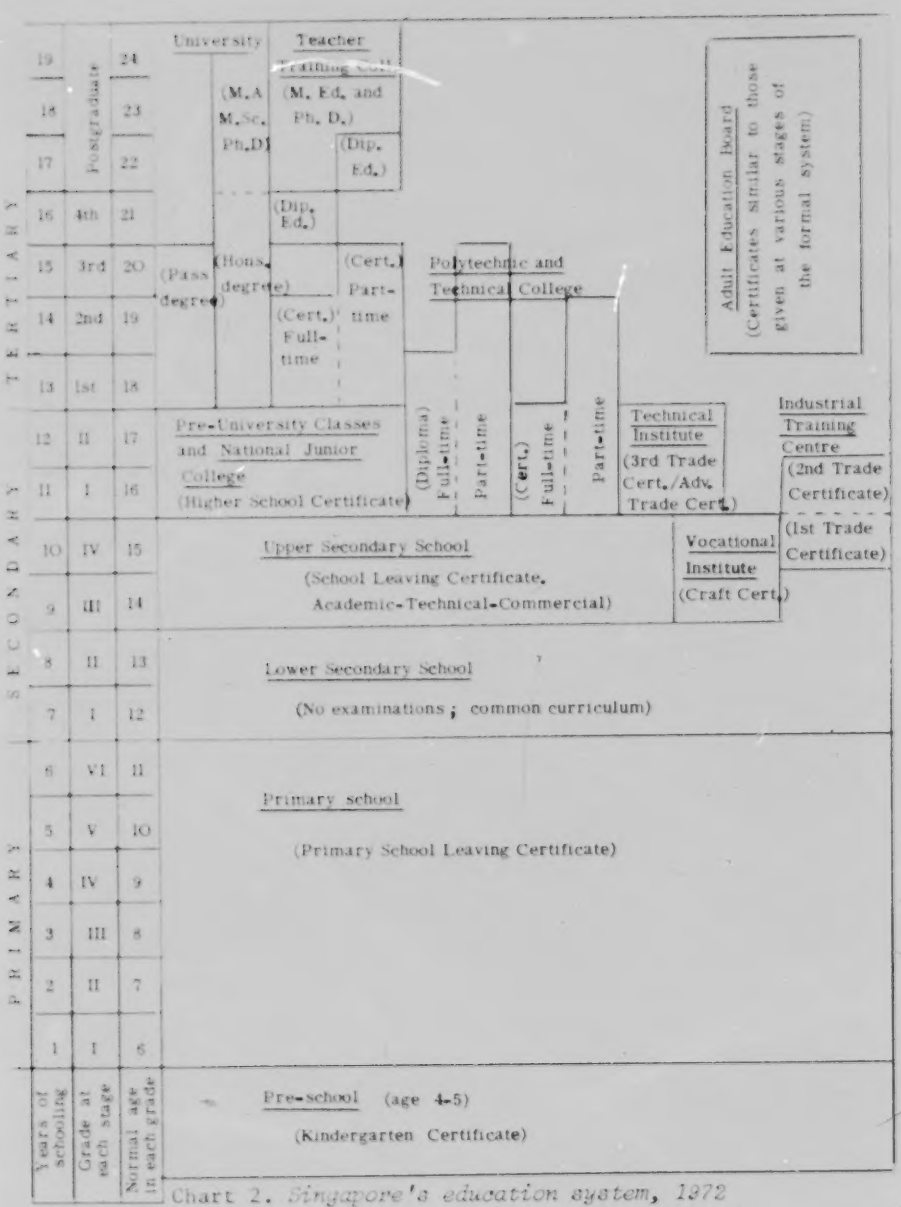

Chart 2. *Singapore's education system, 1972*

II. Perspective on innovation in Singapore

Main characteristics of innovation in Singapore

The foregoing chapter, while not specifying the details of typical innovations, shows how the impetus to change is generally policy-induced, by specific statements, through the issue of white papers on a given educational concern or by ordinance or act. The impetus to change is then followed by persistent action in pursuit of the goals and objectives expressed. The historical account also highlights the inclusiveness, interconnexion and continuity of educational innovation in Singapore. For example, the definition of equality of educational opportunity embraced opportunities for schooling, choice of language, choice of type of education, level of education, examinations and so on.

Innovation in Singapore may thus be linked to a flowing stream, ever deepening and widening its bed in a course which can be seen in clear relief. Seen from another angle, it may be compared to a picture which is gradually transformed from the first bold strokes of an outline sketch to the refined details of a full painting. In either case, as pointed out already in the foregoing chapter, the innovative effort is an entity, with no isolated, encapsulated changes as such. Even the most insignificant innovation stems from the whole and fits into the whole. Thus, there is both continuity and change——continuity in the commitment to specific goals, aims and objectives directs and impels the flow of change.

In short, the characteristics of change in Singapore are, clearly, its purposefulness, its connectedness and its pragmatism.

The course of innovation

Educational innovation proceeds generally through four stages as outlined in table 1.

Table 1

Stage	Organization responsible	Nature of action taken
I. Initiation	Cabinet/ Parliament	Policy pronouncements. Passing of ordinances or acts; issue of white papers.
II. Interpretation	Ministry of Education	Translation of policy into operational terms. Mapping of strategies and controls. Information on and dissemination of innovation.
III. Implementation	Subsystems affected e.g. schools, colleges, universities, etc.	Acceptance and adoption of innovation as understood—experimentation through pilot schemes or wholesale adoption; innovations within main innovation.
IV. Correction	Ministry of Education	Retraction or amplification, refinement or modification.

Stage I: Initiation. Co-ordinated educational planning begins at the highest level of administration, with the Cabinet initiates parliamentary action and policy announcements only after much consideration of their purpose and rationale. This Cabinet-level planning ensures the co-ordination of changes in education with those in other fields and the relevance of change to national needs.

The possibility that political preferences may tend to override other considerations is attenuated in Singapore since Cabinet decisions are generally made after consultation with administrators or specialists in the field. Also select committees of experts outside politics are often appointed to study situations and make recommendations to Parliament.

Stage II: Interpretation. When a policy involving the education system is declared, it is referred to the Minister for Education and then passed on to senior officials at the Ministry, who discuss together the purpose of the innovation, how it relates to ongoing programmes and its likely effects on other parts of the system. It is at this level that strategies and controls are planned before being submitted to the Minister for approval. Various departments at the Ministry likely to be affected by the impending change, such as the Inspectorate, the Examinations Division, the Staffing Section, etc. are then apprised of its objectives and the principles or criteria by which strategies and controls have been planned. They, in their turn, have to consider how to make them effective, by communicating the new policies and their objectives to those ultimately responsible for 'grass-roots' implementation. On their ability to communicate, demonstrate, exhort and exemplify rests, in large measure, the success of the educational change.

Experience in Singapore indicates that the best agents of change not only understand and accept the planned strategies and objectives of the innovations but also, by personal involvement, help to implement them alongside the 'grass roots' implementers. While other agents of change only transmit instructions and methods for implementation, they work more by example than by precept.

Stage III: Implementation. It is desirable at this stage to run and assess pilot projects before the scheme is universally launched. But it quite often happens that, once a policy is proclaimed, immediate implementation is expected throughout the

system. When an innovation is thus fully launched straight from the drawing board it results in less certainty and more reluctant co-operation than one preceded by a pilot stage.

Various strategies have been developed to counteract misunderstanding or rejection of an innovation at the implementation stage. One called the *spearhead strategy* encourages and supports predisposed schools or individuals to develop model schemes, while the total project is being launched. These locally-designated 'innovation nuclei' or resource centres are well able to demonstrate and spread innovations, as they make use of the practitioners themseleves rather than outside agents. This strategy may, indeed, stimulate the practitioners' initiative and it often leads to creative innovations and interpretations within the main objectives of the innovative effort. But a proper scheme of evaluation, built into the particular programme, is necessary to check that results do not go astray.

Another useful strategy in the implementation of changes may be called the *hand-to-mouth strategy*. Plans and materials for change are produced at the Ministry and then distributed to an increasing number of participating 'consumers', drawn from the ranks of the 'target' system. This strategy differs from the first in that the practising teachers merely carry out a prescribed scheme of things, but it does help to reduce the seemingly threatening nature of change. A good example of this strategy is seen in the Primary Pilot Project (PPP), initiated in support of the new primary school curriculum.

A third strategy, which may be called *transference strategy* is useful in situations of entrenched but superable conservatism. Senior members among prospective implementers of change are implicitly furnished with the directives for change while believing that they themselves are the authors of the change. In other words, the implementers of change eventually co-operate in what they believe to be their own innovation. As in the 'hand-to-mouth' strategy, the practitioners do not themselves take the initiative, but here this fact is deliberately concealed in order to reduce conservative attitudes and foster a sense of security which, in its turn, arouses the initiative lacking in the initial situation. This strategy was used both for curriculum renovation and for innovation in teacher education.

Where attitudes are so adamant as not only to embarrass the innovators but also to jeopardize the viability of a given

scheme, a fourth strategy is used. Partial changes related to the over-all scheme are judiciously introduced at convenient and favourable times. This approach works best when the innovators form a constant group subscribing to the goals and objectives originally specified and keeping them in full view until they have been fully met. Meanwhile, the people in the 'target system' catch a clear glimpse of each stage of the coming change but are not necessarily threatened with the import and implications of the total change. Also, as many of the changes as possible are fitted into the existing structures of the system so as to minimize disruption. For the purpose of this study, this strategy may be termed *comprehensive*, though the term is not used exactly in the sense of Miles[9] to whom a strategy is 'comprehensive' if it carries the innovation from the design stage through arousal of interest to evaluation and trial.

This strategy is most characteristic of over-all innovations associated with the announced policies of Government. In Singapore, the strategies described above have been used either singly or in combination, depending on the situation.

Whatever strategy is used, the following factors have been considered essential in ensuring that implementation occurs according to plan:

(a) *maintenance of clear communication lines* between innovating agents and implementers;

(b) *specific steps to ensure that the objectives of change are evident to and perceived to be worthwile by* all implementers in the 'target' system; though most of them prefer and accept prescribed objectives, there are others who, for lack of insight into the change's rationale, sometimes react unsympathetically and thereby, quite unintentionally, become obstacles to change;

(c) *a degree of flexibility for the more committed implementers* to innovate and experiment within given situations: this is useful in both accelerating the desired change, and ensuring a proper quality of involvement;

9. Miles, M.B., ed. The nature of the problem. In: *Innovation in education*. Teachers College Press, New York, 1964, p. 20

(d) *close attention to the needs and acceptance of implementers*, so as to avoid the feeling, sometimes stated by local teachers, that an innovation has been forced on them by 'unrealistic administrators sitting behind office desks in air-conditioned rooms';

(e) finally, *availability to the implementer of feedback* on the progress of change: this is necessary if he is to produce the desired results.

Stage IV: correction. Change in the specific goals and objectives of policies is not infrequent but, instead of being based on informed analysis and appraisal, it is often made too abruptly without explicit reasons. Assessment rests too much on subjective considerations, the random views of unrepresentative change agents or implementers, hurried and partial observations of activities and the like. Much more has yet to be done to evaluate in measurable terms the extent to which goals and objectives have been achieved and to develop carefully methods of evaluation.

But changes have occurred so fast that evaluative research can barely match the pace and the feedback system is not yet effectively installed. Hence the main emphasis currently is on the development of evaluative instruments and, until these have been properly tested, the outcomes of change remain largely unmeasured and conjectural. Nevertheless, correction based on obvious and considered observation, in the absence of more objective instruments, should be pragmatically acceptable.

Factors favourable to educational innovation in Singapore

As has been pointed out, the Government's constant purpose and perseverance in attaining certain goals have played a large part in giving an impetus to change. This approach has the advantages of demonstrating a suitable degree of conviction about the worth of the change and making both planners and implementers accountable for it. True, it also has the disadvantage that undesirable consequences resulting from unforeseen implications of a particular innovation may be irreversible once the tide of change has begun. However, in the long term, undesirable consequences of single innovations turn out to be more than offset by over-all gains in the total scheme of things and therefore to say that this insistent approach has been

favourable to innovation is to indicate willingness to accept calculated risks.

A good case in point was the introduction in 1960 of the Primary School Leaving Examination as a public examination for children in all streams of education. While England was contemplating the abandonment of the 11+, the situation in Singapore was that automatic promotion of pupils through their school years had led to the deterioration of learning (e.g. language skills, mathematics and science), the waste of secondary school places (already in short supply), of material, time (much of which had to be spent on remedial instruction) and money. This was the situation at a time when it was difficult enough to deal even at primary level with the expansion consequent upon the new policies of affording equality of educational opportunity in the most thorough sense of the word.

A decision had to be made then to control quantitative expansion of the school system. So the PSLE was introduced. It was perceived as playing a dual role: on the one hand, it exercised control over school practice and, on the other, it served as a relatively objective selection device for determining who might profit most from further education.

But, as the tail that wagged the educational dog, the examination also played a bogus role. Teachers began to coach pupils for the examination, as schools were increasingly praised or criticized on the basis of the results. True teaching steadily lost its essence, while memorizing facts and notes was strengthened as a learning approach. Over the years, too, objective tests were used without pre-testing or validation exercises. No item-bank was built up. Predictability was not established for each rating instrument used. But inexorably, children were classified as promoted or failed.

Despite all these drawbacks, however, the introduction and maintenance of the PSLE did afford a period of controlled expansion of the system wherein teachers could be trained in sufficient and predictable numbers, schools could be built at a more even though still hurried pace, and resources could be enlarged, even if supply was still short of demand. It was an examination system which, on face value, was fair, and which did not receive much social opposition. It thus allowed time, which would not otherwise have been available, for attending to important priorities such as diversifying secondary education and providing alternative avenues to vocational opportunity.

Also, with the expansion of further education opportunities through the programmes of the Adult Education Board, no 'failure' was really abandoned or unable to proceed to the level of his potential.

As the education system became more stable, it was possible to reconsider the PSLE. It had served its primary purpose, in that quantitative expansion of the system was under control. It was therefore time to evaluate the testing instrument itself and, in 1970, work commenced, on a small scale, with the analysis of the items used in the various tests of the examination. The scores obtained on the examination in successive years were also studied. Correlations appeared very high among certain subjects such as language, history and geography. This was no surprise as language plays a large part in providing the skills for the understanding of history and geography.

It was concluded, among other things, that it was unnecessary for children to be burdened with too many examination papers and that the geography and history papers could be dropped from the examination. Besides, the new curriculum which was being developed required more creative teaching than mere coaching for rote learning. The tradition of motivating teaching and learning through the public examination had to be broken and accordingly, in 1972, the two papers were omitted.

Freed from the tyranny of the examination, the approach to the learning of history and geography has been revised to make their study more meaningful to children. The problem of assessing classroom progress is being seriously examined by means of a two-fold approach. Included in the pre-service teacher training curriculum is a course on classroom assessment procedures to acquaint new teachers with the purpose and techniques of evaluation. It is hoped through them to introduce new and better practices into schools. On the other hand, the work of constructing and compiling a set of criteria on which to base tests for use in the classroom has commenced. This will take time to develop.

The account of the PSLE given above highlights, incidentally, an important factor favouring change in Singapore, namely, that there is sufficient resilience within the system to allow it to accommodate correction and adjustment.

Also, there is much to be said for the small and compact size of Singapore, making it easy to control experiments and the implementation of changes. Communication is easy to maintain

and, given the right change agents, there is little difficulty in following up intention with appropriate action.

The same geographical position which places Singapore at the crossroads of some of the most important highways of the world also gives it easy access to knowledge about changes elsewhere. It also possesses a modern system of data acquisition. For these reasons the opportunity is enhanced to learn about, compare and weigh the feasibility of introducing certain measures into the system. Curriculum renovation has particularly benefitted from the availability of resources (both material and human) elsewhere, though the essence and direction of change remain characteristically local.

Rapid technological progress during the decade has helped to induce and support some of the important changes within the system. It is fortunate, for example, that the heavy expenditure incurred in diversifying secondary and higher education has been well supported by the demand for an increasing range of skills. The problem scarcely arises in Singapore as it does elsewhere of educational change being out of step with technological and social change. The products of the school system are not irrelevant to the needs of society and the phenomena of the educated unemployed or technicians without the agencies or industries to absorb them are very rare. This situation can also be imputed to good leadership which tries to ensure that progress on all fronts——industrial, commercial, economic, educational, social——is kept on an even keel.

Within the last ten years, too, a very effective mass media system has developed. This has proved a boon to educational innovation. The development of the new curriculum has received strong support through the programmes of the educational television service. Another example of the effective use of mass media was in persuading parents to permit their children to pursue studies which might lead to blue-collar rather than white-collar occupations. As in all Asian societies, the concept was prevalent that occupations which required soiling one's hands were demeaning and therefore the response to opportunities for technical education seemed very slow at first. There was even doubt whether the number of places in technical schools would be filled if technical education expanded according to plan.

A campaign was then mounted to sell the idea through the use of mass media. Small, readable pamphlets were published about

the purpose of such education and the vocational opportunities which would become available. Over the public telecast channels the message was constantly addressed to parents and students alike. Public talks, the press—all possible means were harnessed. The effectiveness of the campaign was shown in 1970, when parents were required for the first time to opt for their children's further education in secondary school, namely whether to take technical or general academic studies from the third year onwards. About 17,000 children were found to require places in the technical stream where only 6,000 were available. At this point, the employment of various other criteria with parental choice made possible the selection of the right number of pupils for the places available.

If there is any single agent of change to which one has to point as most effective in educational innovation, it is mass communication.

Lastly, it is pertinent to mention the generally high level of aspiration among Singapore parents. Whatever is perceived as affording an avenue for their children's educational and vocational advancement is generally accepted and supported. But for failure or difficult circumstances, most parents would prefer to keep their children in school for as long as possible. This respect for education helps to promote the preparation of attitudinal, mental and social skills to meet the challenges of continued technological progress. With an increasingly literate population much more can be done to realize the goals and objectives of education in Singapore.

The question may be asked, 'Are there not factors which inhibit change?' Yes, they are to be found wherever change is introduced—entrenched beliefs, the stronghold of unrelieved and monotonous experience, bureaucratic reticence, fear and insecurity, limited financial resources and shortage of educators with both knowledge and perspective—these hamper the progress of change. It is not unusual to meet with the same statements ('killer phrases'), which Stedman[10] mentions, namely:

'We tried something like that years ago.'
'That's ridiculous.'

10. Stedman, J.C. Engineering and the many cultures. In: De Simone D.V., ed. *Education for innovation*. London, Pergamon Press, 1968, p. 40.

'That's too radical.'
'Let's form a committee to consider it.'
'That's contrary to policy.'
'Has anyone ever tried it?'
'It won't work.'
'That's too obvious to be considered.'
'That's superficial.'
'That's interesting, but we don't have the time — or manpower.'

And to add to these for good measure, a well-used local retort is:

'The Chinese (or English, Malay, Tamil, as the case may be) school teachers will not like it.'

However, these problems are more common at the strategy, planning and implementation level than at the policy introduction stage. They are a constant reminder of the need to establish rapport with the clients in the target system, for before that is done the innovation can hardly be described as having 'taken'.

Pace of innovation

Diffusion of innovations does not occur at the same rate in every case, even though the changes may be introduced within the same system and fostered by the same change agents. The timing of and approach to the innovation, the perception and awareness of those in the target system, the degree of disruption created, the efficiency of the information system, the presence or lack of models — all these have been found to affect the pace of change. Thus, for example, following the introduction of the new curriculum in primary schools, methods of teaching primary science have not changed as significantly or as fast as in other areas such as music, because the present science paper in the PSLE is still cast in the traditional form, while music is not anchored to this primary level public examination. Teachers are still teaching science in the imaginary shadow of an examination which is yet four years away. Despite repeated assurances that the examination paper will adjust to the sort of behavioural and instructional objectives specified in the curriculum, insecurity keeps practitioners from taking the plunge.

Some particular areas of innovation

Some of the most interesting innovations have occurred in the following areas: (i) curriculum renovation and development; (ii) development of extra-curricular activities in schools; (iii) development of educational technology; (iv) teacher education; (v) development and diversification of opportunity for secondary education through the expansion of technical education; (vi) follow-up on the policy of integration; (vii) development of educational research.

These areas have been singled out for mention because developments in all of them have been generally continuous, sustained and viable, addressed unswervingly to the basic issues of educational policy. In one of them at least, namely pursuing the integration into a cohesive nation, of the multi-racial, multilinguistic peoples of Singapore, the use of education is a-typical, in respect both of methods and of their application, when compared with that in other countries facing a similar task.

The ensuing chapters will dwell specifically on the course of innovation in three major areas viz., curriculum development teacher education and the policy of integration. With respect to the other areas, a brief look will be taken at the strategies used and the outcomes.

III. Curriculum renovation and development

The problem viewed against historical developments

When the PAP first came to power in 1959, the three aims of the new educational policy enunciated——equal treatment for the four streams of education, the choice of Malay as national language and emphasis on the study of mathematics, science and technical subjects to equip the youth of the State for employment in industry——necessitated an immediate look at the curriculum then used in schools. Though the three aims (excepting the choice of national language) were no significant departure from those upheld in the White Paper on Education Policy, 1956, little had been done by the previous government to ensure their reflection in the curriculum. The content of education in the four streams was not harmonized, neither was it altogether relevant to the needs and social context of Singapore, based as it was on an imported model. Textbooks were likewise 'foreign'——the English stream used textbooks from Britain and Chinese schools had theirs from China. There were few good texts for mathematics and science and still fewer for the technical subjects. Also, the introduction of Malay as the national language posed problems not only of content but of approach.

In November 1959 an Educational Advisory Council was formed by the new Minister for Education. Standing committees were set up to assist the Council in its functions, the main ones being the Committee on Syllabuses and Textbooks, the Committee on Science, Vocational and Technical Education and the Committee on Physical Education. In a sense, all three were related to the needs of the curriculum, but the second committee confined itself to the development of schools and facilities for teaching technical and science subjects, while the third vigorously promoted extra-mural sports.

Thus, it was to the first standing committee——that on Syllabuses and Textbooks——that the task of curriculum renovation

was primarily entrusted. From the Annual Education Reports between 1959 and 1964, the activities of this committee, which had fourteen subject committees working under its supervision, are seen to be the formation of new syllabuses with a common content for all four streams of education and the review of school texts in order that appropriate ones might be recommended for classroom use. Some recommended syllabuses were revisions of pre-1959 ones; others, such as those for the technical subjects, were entirely new. The latter were in use for the first time in 1963. By 1964 there were altogether 32 syllabuses compared to 19 before 1959. Syllabuses were also available for Chinese language and literature and other subjects for use in Chinese secondary schools. Also, the Chinese system of education had been re-structured to conform to the 6-4-2 system obtaining in English streams.

The Committee members worked with commendable earnestness and speed. It was stated in the 1961 Report (Education)[11] that members 'have kept busy throughout the year in reviewing a large number of locally produced textbooks'. This indeed became its main task after most of the syllabuses had been written.

After Singapore's separation from Malaya, a new committee on curricula and syllabuses was set up along the same lines, with subject subcommittees representing the various streams of education. According to the records, this committee met only once (for the inaugural meeting) during the three years between 1966 and 1969. Textbook review had become the work of a special committee headed by an Assistant Director of Education (Curricula and Syllabuses).

In 1969, a special committee at the Ministry was set up to revise the Secondary III and IV curriculum. The main objectives were stated in a Ministry memorandum as being: (a) to avoid narrow specialization and rigid streaming into arts, science, technical and commercial classes; (b) to allow greater flexibility in the choice of subjects in accordance with the student's interest and aptitude; (c) to give the student a broader-based foundation in preparation for a wider choice of courses at pre-university and university levels; (d) to provide those students not proceeding to pre-university classes with greater versatility in meeting requirements for further training or for employment; (e) to reduce the number of examination subjects to seven

11. Published by the Ministry of Education.

for the great majority of students so as to provide more time for non-examination subjects and for extra-curricular activities; (f) to dispel the belief that the passing of examinations is the sole aim of study and that non-examination subjects are of no importance.

It turned out that the special committee did not so much revise the curriculum as reorganize course requirements within the two-year block of the upper secondary school. The results of their deliberations were summarized in the two tables (Tables 2 and 3) below.

Table 2. Revised Secondary III and IV Curriculum for technical students

Subjects	*Periods per week*	*Notes*
A. Compulsory examination subjects	26	
1. First language		Each period is about 40 minutes' duration.
2. Second language		
3. Technical drawing		
4. Elementary mathematics		
5. Physics/engineering science/ physical science		
B. Compulsory non-examination subjects		
1. Civics/current affairs	2	
2. Physical education	2	
3. Assembly talks	1	
4. Musical appreciation/singing	1	
C. Elective examination subjects — choose two	9	
1. Additional mathematics		Special approval is given to an able student to carry 3 electives.
2. Physical science		No. 2 may not be taken with No. 4 or No. 5.
3. Engineering science		
4. Physics		
5. Chemistry		
6. Woodwork		One only of Nos. 6, 7 and 8 may be taken.
7. Metal work		
8. Basic electricity and electronics		
9. Literature/history/geography		
Total	41	

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Table 3. Revised Secondary III and IV curriculum for non-technical students

Subjects	Periods per week	Notes
A. *Compulsory examination subjects*	26	
1. First language		
2. Second language		
3. Literature/history/geography		Elementary mathematics is optional for students taking a total of 6 examination subjects.
4. A science subject/health science/home economics		
5. Elementary mathematics		
B. *Compulsory non-examination subjects*		
1. Civics/current affairs	2	
2. Physical education	2	
3. Assembly talks	1	
4. Musical appreciation/ singing	1	
C. *Elective examination subjects- choose two*	9	Special approval is required for 3 electives. Not more than 2 science subjects (including A4) for any student.
1. Literature		
2. Geography		
3. History		
4. Bible knowledge		
5. Islamic religious knowledge		
6. Third language		
7. Additional mathematics		No.8 may not be taken with No.9 which may not be taken with Nos.8, 10 or 11.
8. General science		
9. Physical science		
10. Physics		
11. Chemistry		
12. Biology		
13. Art and crafts		
14. Music		
15. Needlework and Dressmaking		
16. Cookery		
17. General housecraft		
18. Health science		
19. Commercial studies		No. 19 may not be taken with No. 20.
20. Commerce		
21. Principles of accounts		
Total	41	

In view of stated objectives, the new curriculum offered little significant change from the old. The latter had fixed subject groupings from which electives had to be taken. This imposed restrictions on the choice of type of subject. On the other hand, the new curriculum had five out of seven examination subjects fixed, by having them designated as compulsory. The choice of the two remaining subjects did not allow much scope, despite the number of subjects theoretically available. No school could really offer all the subjects included in category C. The schools in fact did not find it too difficult to continue their previous policy of narrow specialization and streaming of students into arts, science or technical streams, with pupils taking typical subjects in each stream. In other words, the electives which students were supposed to select were really controlled by what the school could offer. Besides, for more ambitious students who would ultimately go to the university, the demands of the university entrance requirements were still dominant and these favoured certain subject groupings. Table 4 shows a typical selection of subjects for each stream.

Table 4. Typical examination subjects taken by pupils in different streams

Arts stream	*Science stream*	*Technical stream*
First language	First language	First language
Second language	Second language	Second language
Literature	History	Technical drawing
General science	Physics/chemistry/ biology	Elementary mathematics
Elementary mathematics	Elementary mathematics	Physics/engineering science
Geography	Chemistry/physics/ biology	Chemistry
History	Additional mathematics	Additional mathematics or Basic electricity and electronics

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It may be noted from Table 4 that, while the arts student was compelled to take a science subject and the science student an arts one, the technical education student could continue to follow a course which carried a strictly technical bias. The offer of physical science to both technical and non-technical students was really to enable them to economize their choice, instead of taking both physics and chemistry, while placing a second choice on a different sort of subject e.g. woodwork for technical students, music for science students. But physical science and woodwork were 'infra dig' to students whose ambition was to proceed to the university.

Hence the revised curriculum did not bring about the fulfilment of objectives (a) to (d) above, although notionally (b) was possible in a limited sense. Objective (e) was the only one fully met and (f), which implied bringing about a change of attitude, has not yet been ascertained in measurable terms.

By the end of the 60s much remained yet to be done. But, from the way the Committee on Syllabuses and Textbooks and its successor Committee ceased further work on the syllabuses after they had been written up, curriculum development seemed to be viewed as a kind of one-shot exercise. The actual 'development' of the content took the form of a listing of topics considered to be suitable for teaching in local classrooms. The preliminary work of examining and analysing various objectives of teaching and learning was generally lacking. Where a set of objectives was given, the operational definitions were either unannounced of unclear.

In the revision of old syllabuses, parts which were deemed unsuitable or obsolete were 'cut' out and new topics 'pasted' in, provided these were contemporary or had local significance. The approach to curriculum development was therefore quantitative. Doubtless it was this approach which gave rise to the teacher's practice of 'covering the syllabus', by which a set of topics for a given year is dealt with, topic by topic in the sequence in which each is listed, whether related or not, until all the year's topics are exhausted. This made for inflexibility in classroom organization and in the learning process: there were no modifications for slow or fast learners. Individual teachers did not feel obligated to participate in the further development of curriculum at their level, particularly in giving creative interpretation to the learning material.

It was even possible, at any given time in a given year, to predict what part of the syllabus most schools were engaged in 'covering', since teachers worked off the topics so evenly according to time.

The practice also existed of keeping syllabuses and the names of the curriculum-makers 'secret', that is, not generally available for public knowledge, except with permission. Ostensibly, this was for the purpose of keeping unscrupulous textbook writers from making use of the materials in the wrong way but it also precluded open criticism of the syllabuses written.

The time was ripe then to embark in new directions and to examine more closely those goals and objectives which needed to be reflected in the curriculum so that it might promote the most desirable learning in the classroom.

The Standing Committee on Syllabuses and Textbooks had indeed fulfilled its functions, to the extent that curriculum content was harmonized for all four streams of education, the teaching of the Malay language was introduced into all schools—as a second or third language—and the science and technical options were expanded at secondary level. It was perhaps for this reason that its successor Committee could not find anything to do for three years.

The Innovation

At the time of her appointment in mid-1969, the Director of Research was given full scope to plan and carry out research. It was her personal conviction, however, that research meant to benefit the system could only result from a proper awareness, understanding and appreciation of the problems at grassroots level. She spent three months visiting schools, talking to principals and teachers. The visits were then followed by a seminar[12] on the theme, 'Whither the Sacred Cows of Education?' to which primary and secondary school principals from each of the four streams of education in Singapore were invited. The purpose of the seminar was to give the Director an opportunity to question certain entrenched beliefs about children and class-

12. This lasted from 19 September to 8 November 1972, as the groups of principals had to meet according to their linguistic association.

room teaching and also to have a frank dialogue with those working in the field on what they as a group perceived to be urgent problems needing attention.

To the credit of the principals concerned, the discussion came round again and again to the concern they felt for the pupils in schools. Yet it was obvious that the root causes of learning problems were not generally recognized as inherent in the approach to the curriculum and in its content.

The results and findings of this seminar were reported to the Minister. The latter felt that it was an opportune moment to set up an Advisory Committee on Curriculum Development (ACCD), since the term of office of the Committee on Curricula and Syllabuses was drawing to a close. Besides, new demands on the curriculum needed to be more fully met. Were children mastering the linguistic skills so necessary to a multilingual society? Were they truly equipped with numerical skills and mathematical concepts which would enable them to contribute optimally to a rapidly industrializing economy? Did they receive insights, skills and attitudes relevant to an active understanding of their physical and biological environment and enabling them to cope with technological progress and its consequences? These were important questions. Accordingly the ACCD was set up, and a Ministry of Education circular was issued on its composition and terms of reference.

On the terms of reference and the functions of the ACCD, I quote:

'The Committee's terms of reference are to advise the Minister, through senior officials of the General Education Department and the Technical Education Department, on all aspects of curriculum development and to supervise the implementation of such recommendations as may be approved by the Minister. Specifically, the Committee's functions will include the following:

(a) to identify the specific objectives of education in Singapore both national and academic;
(b) to be responsible for harmonizing subject objectives with overall objectives;
(c) to ensure that objectives are not only reflected in the curriculum, but are attended to in practical terms;
(d) to re-examine the criteria by which subjects are selected for inclusion in or exclusion from the curriculum and the criteria by which time is allocated to the various subjects;

(e) to review the membership and functions of the various subject sub-committees and to coordinate their activities;
(f) to attend to controlled, trial implementation of the new curriculum with proper concomitant evaluation.'

The composition of the new committee included not only officers at the Ministry but also representative members of the universities, the teachers' college, school principals and teachers. Since its inauguration in 1970, the ACCD has met once each month. It deliberates on all matters having to do with the current curriculum, besides supervising the course of curriculum development.

Planning and strategy for change

From the beginning, the ACCD set out to ascertain its own role in curriculum renovation and development. It perceived its most important functions as directing the course of curriculum development and co-ordinating the work of its subject committees. Before setting up these committees, therefore, it concentrated on four tasks: (a) analysis of the context of curriculum change (social, cultural, national); (b) analysis of needs (individual, society and the world); (c) statement of objectives such as could be gleaned from policy papers and ministerial or parliamentary and professional speeches made from time to time; (d) making the objectives operable.

The approach to these tasks was not research-oriented, that is, there was no exhaustive analysis made or representative data gathered. What was frequently reiterated through mass media and speeches was considered worthy of attention. It was a first round and the approach was wholesale.

The objectives were found to be related to four categories of concern: individual, societal, national and international. It was decided to consider curriculum development in two dimensions embracing these concerns - the horizontal dimension, representing widening circles of concern between the individual and his environment (in the broadest sense of the word, including international aspects); the vertical dimension, dealing with aspects of learning (including knowledge, skills, values and attitudes).

It was decided then that curriculum development should commence from the first level of education upwards and that it would be a continuous series of specify-implement-evaluate-improve cycles.

Continued evaluation and correction would embrace not only the content of the curriculum but also its objectives, the process whereby it would be worked out and the products of the process.

The next steps the ACCD took indicated the following objectives in strategy planning: (a) to ensure qualitative production and implementation; (b) to involve as many people as possible in the task of development; (c) to gain the co-operation of implementers in the classrooms.

With these objectives in mind, members of the various standing committees were selected on the basis of recognized expertise rather than linguistic criteria, though care was taken that committees across the board did include members from different streams. It was felt that after the curriculum was developed for each area of learning, people who were bilingual and knowledgeable in specific areas could help to lend creative interpretation to the content by translation.

The standing committees were no longer chaired by ministry personnel as had been the case with the pre-1970 subject committees. Co-operation was considered more easily available if such an important project was not felt to be ministry-dominated. This co-operation was a crucial part of the strategy, since curriculum development as it was then conceived was a new type of venture and there was no financial provision for it.[13] The fact that it has developed to the extent it has is due entirely to the goodwill of many people involved at every level of the education system. This has been the strength of the innovation, for the more people are involved, the greater is the understanding and awareness of what the new curriculum aims to do.

The ACCD was also quick to collaborate with other agencies which were already interested in curriculum development or were potential sources of assistance. For example, when the Ministry's Standing Committee on Science was set up, the Science Teachers Association of Singapore (STAS) had already embarked upon curriculum development. To enhance the gains, the two committees were brought together and renamed MESTAS (Ministry of Education cum STAS committee). Also members of the Library Association were encouraged to assist with the development of library resources through the Standing Committee on Library Development and the

13. Since 1970, the Research Director's annual submission to the Finance Ministry for a core of six people to be engaged full-time in curriculum development activities has been unsuccessful.

help of ETV, enlisted through the Standing Committee on Educational Technology.

Care was taken at every level of operation to explain the rationale and objectives to those involved. Each operation was preceded by a two-day seminar/workshop for standing committee chairmen and their members, during which it was stressed that, while subjects were represented by various committees, there should be occasion for chairmen of different committees to discuss overlapping and integrated areas; that knowledge would be more interesting to children if related and unified than when dispensed as bits of information and that subjects could preferably be viewed as parts of four major curriculum areas within which integration could be effected. These areas of studies were:

(a) Language arts, including the language skills and knowledge retrieval and application skills;
(b) Environmental studies, including materials from the social, physical and environmental sciences;
(c) Aesthetic studies, including art, craft, music, dance and movement and physical education;
(d) Social education, including moral education (civics, religion), health education.

Finally, the various committees were exhorted to relate the over-all objectives to their specific subject objectives as much as possible; these objectives were to be defined and analysed to the extent that they eventually permeated every lesson in the classroom, at which level, each objective would appear operationally in instructional and behavioural terms.

These emphases on involvement and explanation were consistently maintained at each successive level of implementation.

So far as teachers were concerned, other measures were taken besides the setting up of seminars and workshops. It was supposed by the ACCD that the impact of curriculum innovation was bound to reveal among them three types——the idea-oriented ones (full of initiative and eagerness to implement), the average (these would collaborate, if guided) and the insecure (generally narrow-minded). Hence it was necessary to prepare for treating them differently at the implementation stage. To principals and teachers who could give creative and active interpretation to the new curriculum every encouragement would be given to carry on their work without the Ministry's close supervision. Their schools would be designated as 'model' innovation nuclei and

would be encouraged to help spread the good work by sharing their experience with other schools.

To the second group, guidance would be given by inspectorate staff who would develop materials with them and give advice when solicited. Their schools would be termed 'experimental'.

Clearly, the third group would be reluctant to change and efforts would have to be made to change attitudes, exercise constant supervision and provide prescriptions. To reassure the insecure, it was decided that guidebooks on how and what learning activities could be organized so as to support the spirit of the new curriculum should accompany the syllabuses distributed.

One further strategic aspect should be mentioned. ACCD makes it a practice not only to involve people with a great diversity of experience within the education system, but also to enlist the help of those outside the system in innovating and implementing programmes. The Health Ministry, for example, through its Dental Education and Health Education Units, has enriched the curriculum by its supporting programmes and advice. Parents who are known to be particularly interested in quality education are also among those requested to submit criticisms on draft curricula.

When the first cycle of curriculum development for the primary level is completed, it is hoped to involve the public more thoroughly in school activities through a well-directed mass media programme.

Motto: *If everyone, parents and children, administrators and teachers have a share in the educational enterprise, the gains will be better assured.*

Responsiveness of the system

As mentioned before, the concept and form of the curriculum development introduced were new and so all kinds of difficulties were expected.

Even at the first level of curriculum formation, namely at the subject committee level, chairmen and members were not quite ready for the task of specifying objectives. They would have preferred to specify topical lists. But the new exercise required them first to specify objectives and then to include topics or activities in so far as they were relevant to the objectives.

Within a week three committees turned in the existing sylla-

buses as good enough and most suitable to the needs specified. Faced with this kind of impasse, the Director of Research then personally undertook the development of the primary I and II curriculum for mathematics. While this was by no means perfect, as it was the effort of a single person, it gave the various committees an insight into what was required. The Director also discussed subject objectives with the various committees during their initial sessions.

The different people involved were willing to learn and the outcome of the exercise was all positive. Remarks were frequently made to the effect that if 'others only knew how much better curriculum writers got to know their subjects when forced to think about objectives, they would readily join them'. The work was difficult, but the intrinsic motivation increased as increasing skill made writers more and more critical.

At the next level there were difficulties with the attitudes of practising teachers. Contrary to previous practice, a copy of each syllabus was handed to every teacher, but still the amplified syllabuses with specified objectives and examples of activities were perceived as a threat. 'Too much to read; what time has a teacher left for preparation of teaching' was the attitude of many, still persisting to this day with some. So although the new curriculum was introduced, many preferred to pick up catch phrases and faulty practices derived from those used in other schools. To counter this, inspectors held week-end sessions for teachers from schools within designated districts. Furthermore, teachers were so used to not being asked for their views that when the new syllabuses were issued with columns on each page specifically for their critical comments, none was forthcoming.

A third set of difficulties at the introductory stage, stemmed from a lack of supporting materials. This was solved most creatively at the 'model' schools by teams of teachers developing lessons, programmes and materials together. As each set of materials was proved useful and successful it was stored at the school's own resource 'bank'. These same model schools voluntarily assisted the Ministry to run week-end workshops, display teaching apparatus, and generally to promote the diffusion of innovation by allowing frequent visits of teacher groups from other schools.

A concomitant solution to these difficulties was the preparation by a ministry team (including three experts made available

by the Centre for Educational Development Overseas (CEDO) of special materials which could be used for the integrated teaching of language, mathematics and science. The project, commenced in January 1971, became known as the PPP (Primary Pilot Project) and still continues as an element of curriculum development. It emphasizes those skills considered most essential for effective learning——language skills, number skills and self-learning skills. PPP children are required to TALK about things and DO things. The project aims to develop special teaching strategies to improve oral expression by providing a variety of interesting situations and activities that will stimulate the children's use of language. In other words, the project demonstrates more specifically the spirit of the new curriculum under controlled and guided situations.

The number of children involved in the PPP activities is increased gradually in order that the production of materials may not lag behind expansion. Table 5 gives the numbers involved in successive years.

Table 5. PPP Pupils (1971-1973)

Year	*Primary I*				*Primary II*				*Primary III*			
	E	C	M	Total	E	C	M	Total	E	C	M	Total
1971	560	-	20	580	-	-	-	-	-	-	-	-
1972	7,280	280	20	7,580	560	-	20	580	-	-	-	-
1973	10,120	280	-	10,400	7,280	280	20	7,580	560	-	20	580

E = English; C = Chinese; M = Malay

The 'model' schools are exempted from participation in PPP to ensure some degree of acceptable variety in approaches.

The difficulties described above will continue to move upwards as the new curriculum affects classes further up the system. But both at primary level and, later, at secondary,

practice will correct theory.

The following characteristics of the primary school curriculum are new to the system.

(i) It is structured for two-year time blocks: in other words, Primaries I and II may be considered a single unit to permit non-graded grouping and teaching of pupils in these classes. Similarly for Primaries III and IV and Primaries V and VI. The ultimate objective is to enable each teacher to appreciate the fact that the curriculum is only good when it serves to meet the needs of individual pupils whose growth rate is neither even nor uniform. As the full introduce-implement-evaluate- improve cycle comes round, the time-block will gradually be enlarged to embrace a three-year, and then finally a six-year period so that, from Primary I to Primary VI, all teachers will become more aware not only of the immediate but also of the ultimate objectives. The first cycle of renovation of the primary curriculum will be completed in 1975; that at secondary level commenced in 1973.

(ii) The new curriculum permits flexible school scheduling. Principals can organize their school schedules according to their specific needs, so long as the objectives of the curriculum are borne in mind. They do not need to divide the day's time into arbitrary and limited modules of 20 minutes. Teachers can use the modules of time in integrated blocks which they can lengthen or shorten from day to day, depending on the development of specific topics, as planned beforehand. Children need not stop in mid-track during an interesting lesson when the bell rings, as they used to do under the old scheme of things.

(iii) The new curriculum requires meaningful activities. Music and dance help in the study of language and number. Science is an experience in finding out about things.

Many drawbacks have necessarily arisen from the attempt to impel a full system into uniform action. While these need to be corrected, there is no disturbing evidence to suggest that the new curriculum is having adverse effects. The system seems resilient and has now settled down to implementation with more purpose.

Evaluation

So far, no rigorously controlled evaluation has taken place. A locally constructed pretest of an Australian reading test and an arithmetic test indicated no disturbing lack of cognitive skills which the new curriculum is supposed to afford. From superficial observation and comments of teachers and principals at workshops, the children appear to enjoy their lessons and even slow learners show less diffidence in mastering concepts in mathematics and science. Where teaching is at its best, leadership qualities and group responsibility among children seem to be developing because of the activities encouraged. It may therefore be safe to say, for the moment, that no significant differences may be ascertained between learning outcomes from the new curriculum and the old, but that a thorough measurement of outcomes is likely to highlight positive gains.

IV. Teacher education

The problem

In the educational history of Singapore, the central problem in teacher education has been its 'ad hoc' approach. In other words, until very recently, no comprehensive set of goals and objectives was ever drawn up, selected or examined and development of teacher education was paced and influenced largely by momentary needs. It was never a primary consideration in educational expansion; rather, it often turned out to be a rushed afterthought. There are ample examples to illustrate this.

In the early years, and even up to the First World War, teacher training was aimed at assisting the central core of European school personnel, trained in and recruited from England. Europeans were considered most able to direct specific schools — missionaries, to help fulfil the religious and educational objectives of mission schools; other lay Europeans to teach in the few government secondary and Branch English Schools so as to give locals a thorough knowledge of English, accustom them to the culture and ways of their colonial masters and enable them to discharge certain services in the colonial administration. The Government itself was reluctant to embark on a large-scale programme of educational provision, preferring to regard its role as 'filling the gap in the provision of education left by the religious and private organisations.'[14]

It was natural, therefore, that teacher education remained and was viewed as an 'unplanned' activity, an apprentice scheme under which were recruited 'boys and girls selected by the manager to assist the teachers of schools in maintaining discipline and instructing the lower classes, they themselves continuing to be bona fide pupils, regularly receiving at least two hours of daily

14. Doraisamy, T.R., et al. *150 Years of education in Singapore*. TTC Publications Board, Singapore, 1969, p. 41.

instruction'.[15]

Training teachers in this fashion for English schools could not be satisfactory. It was therefore systematized through the establishment of normal classes for men and women teachers. Even then, the instruction was given by European staff, drawn from the schools, and the curriculum content faithfully reflected that obtaining in England. Later, the establishment of a teacher training institution was mooted because it became apparent that the quality of teachers trained under the part-time normal scheme was unsatisfactory due to their lack of academic knowledge.

Eventually, in 1938, a Diploma in Education course was introduced into the Raffles College curriculum as an additional fourth-year course for intending teachers. It somewhat ensured that teachers had adequate knowledge of content besides the methodology of practice.

The absence of a teacher training scheme was particularly marked with respect to non-English education. Chinese and Tamil schools were left to take their cues from elsewhere. In fact, the former received educational instruction, textbooks and teachers from the Central and Provincial Chinese Governments. The local government did not assist such schools with any teacher training until it became evident that they afforded a seedbed of political unrest. Even then, the first steps taken towards orienting Chinese and Tamil schools to common ideals and objectives were almost valueless since they took the form mainly of ordaining the use of premises, textbooks and the registration of teachers. Even though it seemed clear as early as the 1920s that teacher education for Chinese teachers was necessary to counteract undesirable influences, it was not until 1939 that an in-service course for teachers in Chinese and private English schools was added, by the Government, to the teacher training programme.

The development of teacher training for non-English school teachers, however, was characterized by considerable confusion which continued into the late 60s. For example, graduates from Chinese and Indian universities were admitted on the rigid basis of whether their degrees were or were not recognized by the Government for service purposes. Admission prerequisites were otherwise not clear. There also crept into graduate teacher

15. Education Code, 1902.

training an unnecessary bifurcation of course work. Those Chinese graduates who preferred to teach or were teaching at primary school had to undergo a three-year teacher training course leading to a certificate qualification. Others, who taught at secondary level, had to pursue a two-year diploma-type course, as distinct from graduates from local universities who where admitted into a one-year in-service diploma course. To add insult to injury, those holding the certificate were paid much less than those with the diploma, causing a great deal of discontent among Chinese teachers.

An expedient was introduced also, whereby certain teachers in non-English schools were certified 'trained' if they had a stipulated number of years of teaching. These did not undergo any formal, professional tutelage as such. Add to this a number of other expedients, classified under TUOS schemes[16] based on ad hoc offers of training which were of varying length and content, and it is quite clear that teacher training needed over-all reorganization.

When the post-World War II Ten-Year Programme was mooted, it had among its recommendations that 'teacher training for Malay schools would take place in the Federation (Malaya) and a teacher training college would be established in Singapore'. It should be noted that the suggestion with respect to Malay teachers was made without current knowledge of events that were to happen a decade and a half later. Thus to-day, one important problem which has yet to be solved is the re-orientation of staff of non-English schools to local objectives, since Malay, Chinese or Tamil teachers trained elsewhere are prone to carry with them associations and feelings which do not necessarily support local aspirations.

Unfortunately, when the Teachers' Training College was set up in 1950, it continued to maintain a primary interest in the full-time training of teachers for English schools. Chinese normal-classes continued at the TTC. This bias was not altogether due to lack of sympathy and foresight. There was also difficulty in recruiting teacher educators of the right calibre. As a result, when training was offered, the teacher educators (who themselves were untrained) occupied a paradoxical position which permitted them to supervise, examine and award teacher qualifications so

16. TUOS: 'trained under other schemes'. These were made available only to Malay teachers.

long as they were staff at the college, but which accorded them untrained status should they return to the role of teachers in school.

Summarizing, then, the points made above, teacher education at the beginning of the 60s suffered from the following deficiencies.

(i) There were no clear objectives governing the planning of curriculum; much of the content was a borrowed one, faithful to a system belonging to a foreign country.

(ii) There was no parity in the provision of teacher education for the four streams of education.

(iii) Criteria for admission to courses were uneven.

(iv) In-service and pre-service courses were not differentiated; there was good reason for this in that many serving teachers were untrained and undergoing training for the first time. They were therefore given the same diet as pre-service teachers. Despite the maturity and experience of such teachers, the in-service course did not take note of these qualities and assumed an entire ignorance of what comprised teaching.

(v) Artificial classification of types of teacher training began to induce narrow specialization: for example, in 1928 an Education Department Committee proposed a scheme of in-service teacher training with separate courses for lower primary and upper primary teachers. Later a vertical trichotomy developed in such a way that upper primary teachers could not teach lower primary children, while secondary teachers could not handle the work of primary school. The system helped to foster this by paying teachers differently at each educational level, instead of according to their level of academic attainment and professional training.

(vi) Teacher educators were inadequate, particularly for the non-English streams. For the English stream the greatest shortcoming was the recruitment of theoreticians who had had little or no teaching experience. Professional training was thus very much an academic exercise, with no observations or demonstrations of practice. Generally speaking, notes and exhortations were the main ingredients, although occasionally a gifted teacher-educator exemplified the best in teacher training practice.

Nature of the innovation

Most innovation in teacher education has occured since 1960. This innovation may be considered in two stages: (a) innovation out of necessity, 1960-1968; (b) planned innovation, 1971 onwards. The years between these two stages did not show much action.

Innovation: Phase I (1960-68). In the first stage, the teacher education system had to cope with unprecedented and overwhelming demands. These were due mainly to the determination of the PAP Government, which won the elections for the first time, to make good its election pledges. The most important of these were equal treatment for the four streams of education (Malay, Chinese, Tamil and English), the acceptance of Malay as the national language of the State and emphasis on mathematics and science to meet the requirements of an industrialized society. Also free primary education was made available to all children of the correct age 'who were either born in Singapore/Malaya or were children of Singapore citizens'.[17]

Table 6[18] gives some idea of the status of teacher supply at the time.

Table 6. Trained/untrained teachers in primary and secondary schools, 1959

Type and Level \ Stream	ENGLISH			CHINESE			MALAY			TAMIL			ALL SCHOOLS		
	male	total	female	male	total	female	male	total	female	male	total	female	male	total	female
Primary Trained	1445	2763	1318	420	1108	688	268	395	127	21	39	18	2154	4305	2151
Primary Untrained	674	1607	933	1371	2615	1244	158	254	96	4	11	7	2207	4487	2280
Secondary Trained	548	907	359	134	198	64	-	-	-	-	-	-	682	1105	423
Secondary Untrained	158	58	216	350	127	477	-	-	-	-	-	-	508	185	693

17. Ministry of Education. *Annual report, 1959* and ... *1960*. Singapore, Government Printer, 1961; 1962. p. 3, para 15; p. 2, para 9.
18. Extracted from Appendix III of the *Annual report, 1959*.

In fact, 51 per cent of the teachers at primary school and 38.5 per cent at secondary school level were untrained. But by 1960 the school population had increased from 32,977 in 1959 to 349,870 —an increase of 28,893 in all, requiring some 720 new teachers. The total backlog, inclusive of untrained teachers carried over from 1959, was in the region of 5,900. The Government was quick to take the initiative at this time of need. Either children were to be denied places in schools with the medium of instruction specified by parental choice or new places had to be created and, concomitantly, new teachers found. The latter was the action chosen.

In the beginning of 1960 a single system of in-service training applicable to all language media was introduced, on the recommendations made by a Ministerial Committee appointed in October 1959. The recommended course was of three years' duration. With its inception the old part-time normal training scheme as well as the full-time two-year pre-service course were removed. For the next five years the College concentrated on the in-service training scheme only. Such a scheme was expedient in that it permitted student-teachers to be attached to a school for a half-day, either in the morning or the afternoon, and to draw a stipend while training. To cope with numbers, two-session schools became the order of the day.

In the same year, a one-year in-service training course for graduates wanting to undertake full-time employment in schools was initiated at the Training College. This course led to a Certificate-in-Education qualification which was recognized by the Government as equivalent to the Diploma in Education awarded by the University's School of Education. In making a one-year in-service course equivalent to a one-year full-time pre-service course, the Ministry of Education, which controlled the programmes of the Training College, was able to induce increasing numbers of graduates to undergo training. However, this affected adversely the course enrolments for the Diploma in Education offered by the University.

When in 1962, the Government, following the declared principle of parity of treatment for all groups irrespective of race, sex or religion, accorded women equal pay with their male colleagues, women flocked to teaching.

Between 1960 and 1965, no full-time courses were offered. The re-introduction of such courses was made only after the demand for teachers was perceived to have stabilized. Yet with

their re-introduction, the part-time courses continued, because a considerable backlog of untrained teachers remained to be upgraded.

An evaluation of Phase 1. Innovation arising out of necessity fulfilled its purpose in so far as the primary objective of providing a sufficient number of teachers for a rapidly expanding system was concerned. Not very much could be claimed beyond that. The problems which confronted teacher education at the beginning of the 60s remained, some even in a more aggravated form, and the so-called single system of training only obtained in the sense that the College enrolled no full-time students at all. The courses for different groups of graduates, for example, continued to be dissimilar with regard to the period of study required, though they were supposed to lead to the same professional qualification, the Diploma in Education. One course was more rigorous than another, depending on how much matter could be crammed into the time available. Examination papers for the same subjects also varied from course to course. While the various courses were nominally made to carry the same subjects for each of the four linguistic streams of education, there was in fact no apparent communication between streams about what should actually be taught. The question could well have been raised as to how similar qualifications could be equated across groups and between streams. Table 7 shows the different courses available for the period 1960-68.

The same weakness was observable in connexion with the teacher education curriculum as with the primary school one. Topics, information and content were the preoccupation of the curriculum makers, while objectives tended to be lost. The curriculum was unrelated to changing needs, unbalanced and unintegrated, lacking in problem-orientation and dominated by examinations.

Administratively speaking, the appointment of teacher trainees entailed particular problems, as the Public Service Commission was responsible for appointments to the civil service, including the education service, and the College authorities were obliged to admit any student passed by the Public Service Commission. This meant that the criteria for selection was externally determined. Usually, the interviews conducted by the Public Service Commission extended right into the college year, necessitating the organization of new classes as each group of trainees was admitted. Hence multiple classes developed for students pursuing

the same course. In a certain year, each lecturer gave his set of lectures six times over to six separate classes—a most uneconomical use of time and people. Such a system made everybody busy without creative involvement.

Table 7. Main courses offered at the TTC, 1960-68

Type / Year		1960	1961	1962	1963	1964	1965	1966	1967	1968
Cert. Ed. (General)	English	1020	1058	1345	2274	2707	3324	2449	2033	1118
	Chinese	980	961	951	1183	1098	946	444	275	95
	Malay	17	24	42	158	263	404	610	613	369
	Tamil	-	-	5	14	29	21	40	52	41
	Total	*2017*	*2043*	*2343*	*3629*	*4097*	*4695*	*3543*	*2973*	*1623*
Cert. Ed. (HSC)	English					126	216	378	378	199
	Chinese					51	149	298	412	241
	Malay	-	-	-	N.A.	-	-	-	-	3
	Tamil					-	-	-	-	-
	Total				*68*	*177*	*365*	*676*	*790*	*443*
Cert. Ed. (Commerce)	English					36	53	40	42	25
	Chinese					6	20	29	22	8
	Malay	-	-	-	N.A.	-	-	-	-	-
	Tamil				-	-	-	-	-	-
	Total				*26*	*42*	*73*	*69*	*64*	*33*
Cert. Ed. (Technical)	English			56		92	138	166	151	135
	Chinese			66		93	80	68	58	47
	Malay	-	N.A.	-	N.A.	-	-	-	4	12
	Tamil		-	-	-	-	-	-	-	-
	Total		*42*	*122*	*169*	*185*	*218*	*234*	*213*	*194*

Table 7 (continued)

Type / Year		1960	1961	1962	1963	1964	1965	1966	1967	1968
Cert. Ed. (local graduate)	English	25	45		47	80	109	107	116	66
	Chinese	104	119		122	26	128	106	87	58
	Malay	-	-	-	-		-	-	-	-
	Tamil	-	-		-	-	-		-	-
	Total	*129*	*164*		*169*	*106*	*237*	*213*	*203*	*124*
Cert. Ed. 2-year course	Chinese Graduates	-	-	-	-	-	-	-	47	47
	Industrial Graduates	-	-	-	-	-	-	-	-	11
Cert. Ed. 3-year course	Chinese Graduates	-	-	-	-	-	-	-	27	24
Cert. Ed. Domestic science	English							28	69	94
	Chinese	-	-	-	-	-	-	-	24	28
	Malay							-	9	12
Home economics	English								-	-
	Chinese	-	-	-	-	-	-	-	10	14
	Malay								-	-
Cert. Ed. Mixed farming	English	-	-	-	-	-	-	-	2	-
	Chinese								15	-
Cert. Ed. 2-year full-time	English							-	55	128
	Chinese	-	-	-	-	-	-	64	108	110
TUOS		181	292	499	385	254	15	-	-	-
Other special prof. courses		-	278	553	-	136	252	704	773	130
In-service and non-prof. courses		3909	1006	503	289	458	389	453	133	3487
TOTAL		*6236*	*3825*	*4030*	*4736*	*5455*	*6244*	*6984*	*6515*	*6502*

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The employment of staff was based on the amount of work to be done—defined as 22 staff-student contact hours per week, including the classroom supervision of students engaged in full-time teaching. But, because lecturers were too busily occupied in lectures and repetitive tutorial duties, the supervision of practice had to be 'squeezed' in between lecture hours as well as possible. One consequence of this was that supervision had to be quantitatively defined as 'three visits per student, one assessment to be made per visit'. If a lecturer presented himself three times in a particular student's classroom, he could be considered to have discharged his full supervision responsibility with respect to that student. This, in effect, was how teaching practice came to be regarded. Again, the records do not show a list of objectives in practice-supervision nor a description of what the eventual behaviour of a trained teacher should be at the end of the course.

In another aspect of the College programme reform was needed, namely, the examinations. An average examination paper was set for three hours during which a candidate had to answer five out of a selection of anything between 8 and 12 questions. A selection of 8 questions might include 5 or 6 recall types and some application of concepts in the rest. Candidates invariably preferred the recall types and this produced quite stereotyped answers. Imbalance between papers was another weakness of the examination. The 'methods' paper for the Diploma course, for instance, permitted answers to 5 questions, 2 of which were addressed to one subject method, 1 to another and 1 question to health education. Other papers were relevant to only one subject. Each candidate had to pass each paper before passing the examination. On superficial judgment, this seems extremely rigorous and yet statistics for each year of the decade show an average of only 2 to 3 failures for each cohort of students. In some years there was none. On the evidence, the conclusion one might make is that the dominant rote-recall type of examination question had little discriminative value and made it easy for students to pass the examination.

Innovation: Phase II (1971 onwards). Soon after the new curriculum for Primaries I and II was introduced, the Minister made a change in the administration of the College. A new principal was appointed in mid-1971 with the specific brief 'to reorganize the College and see to it that a new breed of teachers, sympathetic to the spirit and objectives of the new curriculum, would

be trained'. Innovation was introduced in three areas.

First, in the administration. A Committee of Heads of the College was set up to assist the principal in decision-making, particularly with respect to the professional programmes of the College. Matters which came before this committee once a month related to course curricula, student progress, programme planning and development, evaluation problems, and the like. This paved the way for better communication between departments, a clearer perspective on common goals, a deeper involvement of departments in important issues and concern for attaining quality education. In this sharing of responsibility it was logical that there should also be a sharing of accountability. Thus the College was no longer only the principal's concern. It was everybody's as well.

The second innovation dealt with the curriculum. An ad hoc committee was next set up to examine the aims and objectives, first of the College as an institution and next, of the various courses it offered. This committee was appointed by the principal and most of the members, including its chairman, had long association with the work of the College.

The new curriculum which was eventually accepted——after discussion by the Heads Committee——met, therefore, with everyone's satisfaction. The following major changes to the curriculum were made.

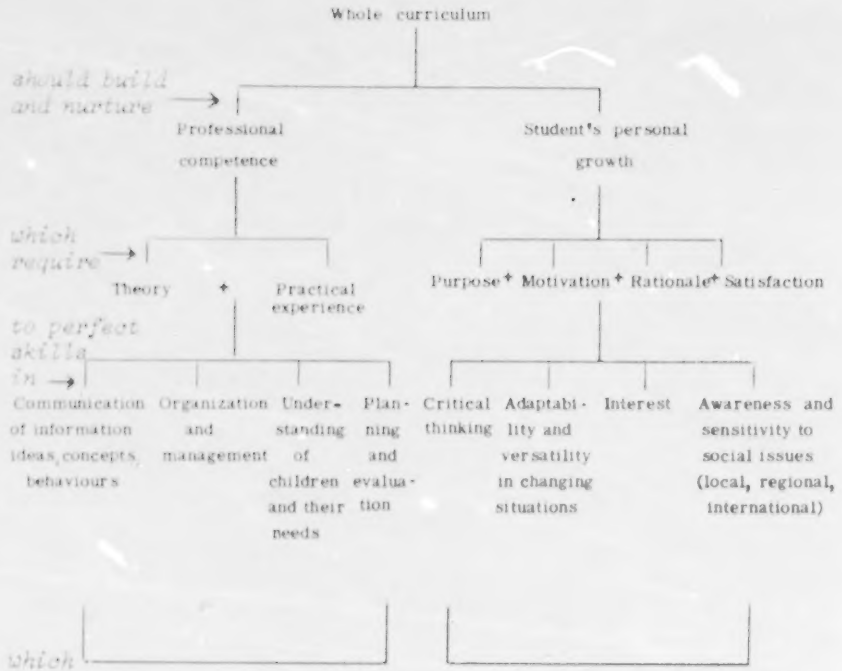
(i) The improvement of teaching practice through defining the eventual behaviour to be expected at the end of the course; the number of supervision visits would no longer be specified but lecturers, through effective feedback methods or personal demonstration, were to try their best to help students cultivate acceptable styles consistent with the objectives of teaching practice.

(ii) Courses were specifically chosen to develop professional competence and foster the student's personal growth; the former required the integration of theory and practice, while the latter required the student to develop purpose, motivation, rationale and satisfaction (Chart III gives the structure and content of the new curriculum).

(iii) Methodology was no longer to be divorced from content or theory.

(iv) Evaluation was to be diversified through the introduction of individual projects, progress ratings and observation schedules; examination papers were reduced in number.

Chart 3. *Structure and content of the new TTC curriculum*


Whole curriculum
should build and nurture
Professional competence
Student's personal growth
which require
Theory + Practical experience
Purpose + Motivation + Rationale + Satisfaction
to perfect skills in
Communication of information ideas, concepts, behaviours
Organization and management
Understanding of children and their needs
Planning and evaluation
Critical thinking
Adaptability and versatility in changing situations
Interest
Awareness and sensitivity to social issues (local, regional, international)
which imply studies in
(a) Psychology of human growth and behaviour instructional and learning behaviours human relations measurement
(b) Strategies in planning
(c) Methodology
(d) Uses of educational technology.
(a) Philosophy of ideas - western and oriental
(b) Sociology of urbanization and industrialization
(c) Contemporary issues in education through comparative studies
(d) Local systems
(e) Special interest subjects.

When these changes were about to be introduced, the principal was invited to hold a ten-day seminar, on the new curriculum and the changes in the College, with all staff members of the College. Following each of the papers she gave during the seminar, there was group discussion. This seminar was a profitable initiation exercise.

The third innovation was in the area of human relationships in the College. Despite the fact that integration of the different streams of education had been an oft-repeated aim of education in Singapore, the TTC continued to maintain four mutually exclusive streams (each with its own divisional head) in the organization of teacher education. The staff of the four streams kept very much to themselves. Student activities were arranged strictly on linguistic lines so that almost every society in the College was fourfold.

This situation seemed to the new principal incongruent with the national goal of integration and, since most students and staff were already bilingual, with Englsih generally as the common language, she encouraged the formation of a single Students' Council to embrace all streams. At the same time she assisted the staff to set up their own Senior Common Room. All activities of the College were henceforth to be common activities. It has been an enriching experience to see the success of this extra curricular change. Musical evenings at the College, for example, have attracted all groups to join in singing one another's songs. Since life in Singapore's schools must begin at the College, it is hoped that the first group of students exposed to this new programme will help to promote better integration in the school system.

Responsiveness of the system: an evaluation. I have omitted the mention of strategies as such: they are already implicit in the actions taken. At all levels of the College, the response has been encouraging. Generally, the staff have found more time for themselves, since, in the reorganization, multiple classes have been abolished. Heads and their staff work more closely together because the same spirit of sharing responsibility and trust shown by the administration permeates to the lowest levels of the teaching ranks.

Between staff and students a closer rapport has also been established resulting in specific gains. Verbal reports have come in from school principals expressing their appreciation of the spirit of dedication already perceptible in the new trainees

doing teaching practice in their schools. From the students too there have been favourable comments about the new courses, compared to the traditional ones.

But the College itself is planning a more systematic evaluation. At the end of the course, students will be asked to evaluate every aspect of it — content, activities, teachers. There will also be a follow-up study of each cohort as it moves out from the College into the school milieu.

In one respect much more headway has to be made. Lecturers have been loth to submit themselves to teaching pupils in front of their own students. They prefer to supervise by theorizing and verbalizing. It may therefore be necessary to consider planning sabbatical leave for staff in such a way that it stipulates a period to be spent in schools for the renewal of practice.

The future

At the time of writing this paper, plans are afoot for the formal establishment of the Institute of Education which will replace the present TTC.

The new Institute, as an autonomous institution, independent of the Ministry of Education, should continue to develop further some of the changes already introduced. One thing can certainly be anticipated. The graduate and postgraduate programmes at the College, begun in association with the University of Singapore since the appointment of the new principal, will gain in strength. Other programmes, such as the continuing education of teachers, will receive more specific attention. The Institute will also be a centre for educational research. Thus the current changes serve but to adumbrate more significant ones yet to come.

V. The policy of integration and its follow-up

Problem

As has already been pointed out, the cornerstone of Singapore's educational policy is the principle of equality of educational opportunity for all. One working definition of this policy is the provision of education for every child in the language medium of his parents' choice. Hence within the education system four streams of education are maintained up to secondary level, namely, English, Chinese, Malay and Tamil.

This policy of equality was, politically speaking, a sound move. It has precluded the dominance of any single language group over others and allowed the minority groups, the Indians and the Malays, a place in the evolution of the national character. It has dispelled the threat which the Chinese majority perceived in the education system — as it was handed down from the colonial administration — a system which emphasized mainly the development of education in English. It has ensured the continued nurture of the rich, cultural heritage of each ethnic group and, finally, it has preserved the use of English as the language of commerce and industry through whose active concerns Singapore is linked to the major cities of the world.

On the other hand, the deliberate promotion of four parallel streams of education carried with it the inherent danger of further strengthening communal preferences and inter-group barriers. Significant multi-racial enrolment in fact occurred only in the English language stream, while Malay, Chinese and Tamil streams were composed almost entirely of students from single ethnic groups. Could a young country whose population comprised mainly first or second generation Singaporeans of diverse immigrant origins really afford such a potentially divisive system of education? Might this not hinder the task of forging a national identity?

The Innovation

The Government's response to these problems was that neither the goal of equality nor that of national cohesion should be subordinated and, in late 1959, it decided on the policy of integration through schools. The plan for implementation was simply to bring two language streams together under one school roof, a single head and a common curriculum.

Through the imposition of physical desegregation the opportunities for interstream contact and mixing would be enhanced. This would in turn promote better understanding between groups and facilitate the breaking down of communal barriers through 'joint participation in sports and other extra-mural activities'.[19] A further benefit would be the improvement of second language skills.

Implementation

Table 8 shows the number of integrated schools as against other schools for the period 1960-72. From the table, the following observations may be made.

First, more secondary schools have been integrated and at a faster rate than primary schools. The question may well be asked as to why more primary schools have not been integrated when quite clearly the gain would have been much greater at that level than at the secondary. Younger children are known to be less prone to prejudice, to mix better, and to learn languages from one another much faster than older children. The simple answer may be found in the limitations imposed by the school building programme. It was not possible to integrate within existing schools, short of a major redeployment of pupils across streams and a massive dislocation of pupil groups and teachers. Only within new schools could the programme of integration (as planned) take effect. Since secondary schools were much fewer than primary schools to start off with, the building programme gave proportionately greater opportunity for integration at secondary school level than at primary. The number of new primary schools built was behind that for secondary schools (33 as against 41), but the number of primary schools finally integrated (58) measures well against the 49 at secondary level.

19. Ministry of Education. *Annual report, 1959*. Singapore Government Printer, 1961, p. 3.

Table 8. Number of government and aided schools, 1960-72

Year	GOVERNMENT					AIDED				
	All schools			Integrated		All schools			Integrated**	
	Primary	Secondary*	Full	Primary	Secondary*	Primary	Secondary*	Full	Primary	Full
1960	165	27	1	-	2	248	21	31	-	-
1961	168	30	1	5	2	244	21	28	-	-
1962	172	31	1	10	2	243	22	25	-	-
1963	185	36	1	20	4	237	22	25	-	-
1964	184	43	1	29	14	235	22	25	-	-
1965	191	56	1	37	28	225	23	26	-	-
1966	193	63	1	40	35	219	19	31	1	-
1967	197	69	1	44	42	210	17	33	1	-
1968	198	77	1	51	53	203	16	32	1	-
1969	200	70	-	55	51	194	14	33	1	-
1970	198	68	-	58	49	190	16	30	5	-
1971	197	68	-	59	49	187	18	28	5	1
1972	198	68	-	58	49	185	18	27	6	1

* Includes technical, bilateral and vocational schools.
** There are no integrated aided schools at the secondary level.

Secondly, very few aided schools have been integrated by comparison with government schools. Since most of the aided schools belong to the Chinese language stream, a sizeable proportion of Chinese students are thus beyond the influence and scope of the innovation. The reason for the small number is clearly similar to that given in the first observation, namely, the physical inadequacy of existing school buildings. Also, while aided schools receive almost total financial support from the Government, the latter has been suitably cautious about taking a position where it could be accused of interference. Any move for integration had to be voluntary.

The third observation is that by the end of 1972, only about one-quarter of all schools (government and aided) were integrated. These represented about one-third of the student population, drawing attention again to the fact that after a dozen years the innovation has yet to diffuse through the greater part of the system.

Outside the school walls, however, integration among pupils of all streams has been vigorously promoted through extra-curricular activities. Since 1960, all interschool sports competitions run along language lines have been abolished. Every encouragement has been given to attract mass participation not only in sports activities but also in camps, youth organizations and welfare work. A youth festival is held annually when the best talents from schools in music and dance, arts and crafts, physical education and activities of youth organizations are presented at concerts, exhibitions, displays and parades. On such occasions all schools are joined without considerations of language. These activities are seen as providing opportunities for nurturing a sense of togetherness and common loyalty. Multi-lingual music and sports groups have also represented the nation at various meetings abroad.

In the process of integration, language was perceived right from the start as a useful instrument. Malay, as the national language, is taught to every student and the policy of effective bilingualism, both in the cause of integration and professional success, has been vigorously pursued. For professional reasons, the learning and use of English as a second language tend to prevail over any of the other languages. Thus, in the English stream, pupils of different ethnic origins learn their mother-tongues as second school languages, while those in non-English streams read English as a second language.

The Government has recently reinforced this trend by requesting all schools to work towards the eventual teaching of science and mathematics in English and social studies and civics in the mother tongue. Other subjects may be taught in either language, provided that 40 per cent of the ultimate curriculum time is devoted to instruction in the second language.

This latest step towards achieving unity and understanding among the young multi-ethnic Singaporeans adds linguistic desegregation to physical desegregation.

Evaluation

Evaluation of this particular innovation is difficult, since there are too many confounding variables affecting the outcomes. A few studies have shown, for example, that principals knowing only one language in integrated schools tend to achieve less than bilingual principals. Also, wherever the principal has deliberately taken every opportunity to join groups in activities, children in the two streams tend to know one another better. Otherwise, lack of contact between linguistic subgroups in the school may enhance awareness of and thus exaggerate their differences. One expert[20] pointed out the importance of teachers as 'brokers' in the process of bringing about changed attitudes, since they belong to both the 'subordinate and superordinate cultures within the integrated school and can mediate between the one and the other'.

This last observation in its turn emphasizes the importance of preparing teachers with the right attitudes on such matters as developing a common loyalty and understanding and encouraging awareness of common needs and purpose. As was mentioned in the previous chapter, the process of integration at the TTC has only just begun and will take time to make itself felt. One difficulty principals face in integrated schools is the uneven number of classes in the two streams. This is particularly true wherever existing schools are converted into integrated ones by the introduction of a few classes taught in a different language. Inadvertently, because of an administrative difficulty, a minority group situation is introduced and it takes a wise principal to ensure that two-way interaction is properly maintained.

20. K-M. Waldhauser, a Colombo Plan teaching expert in Singapore in 1967.

The suggestion may be made that new classes in integrated schools should have even numbers of pupils in order to balance out the streams. But this is not possible as children are enrolled in schools and streams mainly according parental preference. Many problems remain, but the will to forge a cohesive nation is strong and in the light of experience the solutions are constantly modified or amplified.

In the matter of increasing the exposure to or use by pupils of the second language, the experiment is still too young to be evaluated. There are also specific problems related to language teaching in a multilingual context — the definition of mother tongue, for example. The Chinese taught in school is not the mother tongue of all Chinese children.

The teachers again are an important consideration. The nagging fear prevails that those already found inadequate in implementing the new curriculum, currently launched, may be even more wanting when expected to teach subjects in the second language. But this does not mean that the innovation will necessarily go astray. Since the goal is fixed and clear, as it always has been in context, an intensive effort will have to be made to correct teacher inadequacy and to anticipate and arrest its adverse effects.

There is currently much attention addressed to planning strategies for the improvement of teachers. With their success or failure, innovation in integration shall stand or fall. Time will tell what effects will accrue and, as in everything else, proper evaluation will be instituted to assess the results of these policies.

VI. Innovation and more innovation

Space does not permit a separate treatment of each of the four important areas of innovation, namely, the diversification of educational opportunity at secondary level, the development of extra-curricular activities, of educational technology and of educational research. However, the first has been touched upon here and there in the development of the present account. It is convenient before drawing the subject to a close to consider the last three areas together briefly.

One important common characteristic marked the initiation of the extra-curricular activities programme and the development of educational technology and research. Each was vigorously pursued as an important adjunct to the main school programme, providing the needed girders for the wholesome growth of the whole system. While the school programme itself aims mainly at congitive development, the others help in developing physical and social aspects, while research ensures the health of the whole educational process.

The various statements made with respect to the purpose of each of the three programmes make this clear. Of extra-curricular activities, a Ministry of Education memorandum had this to say: 'All extra-curricular activities have been organized to enable the individual pupils to have the opportunities of developing his or her personality to the full so that he or she will turn out to be a disciplined person of robust health and vitality for purposeful living together with zest and pride in performance reflecting our national spirit'.

Educational technology which grew out of certain activities concomitant with the setting up of an ETV production centre at the Teacher Training College has as its 'main function the improvement of education in general'. Educational research which began slowly in 1967 and gathered momentum after 1969 is 'concerned with such aspects of education as the continuous appraisal of educational organisation and practice in the light of natio-

nal and social objectives'.[21]

Strategy

In the strategy for organizing, planning and introducing these programmes the questions which had to be answered chiefly concerned the selection of specific areas of attention and the pace of development in order to achieve the goals specified. A great deal of the strategy's success depended on the people providing the substance of these programmes.

Thus for extra-curricular activities, initial attention was paid to the training of potential leaders — selected from among the teachers — in four designated areas: sports; uniform group activities; societies; occasional activities — festivals, national day parades, and other special functions. For each of these areas, leaders were trained. A new and enlarged Extra-curricula Activities Centre was set up in 1970 to cope with the increasing need for special courses of training.

Educational technology required both hardware and software. It was easier to provide the former but specialists were needed to develop the latter and to train teachers in the use of both. Towards this end, a special Audio-Visual Activities (AVA) unit was set up in the Ministry of Education in 1970 with the return of a specialist from training abroad. Meanwhile, the ETV production centre, started at the Teachers' Training College in 1966, had developed and, through staff training and opportune appointments, was in a strong position to include among its activities the preparation of video-taped programmes for telecast over the public TV channel, the issue of publications for use in schools, and evaluation activities. At the training college's own AVA department, a resource centre for teachers was set up. The activities of these various departments have been coordinated under the Standing Committee for Educational Technology of the Ministry's Advisory Committee on Curriculum Development.

As a result of these developments, educational technology plays a big role in the recently introduced new primary curriculum for local schools. On the average, each school has at least one television set, two tape recorders, one cine-projector,

21. In statement issued by the Minister for Education on the Appointment of the Director of Research, 1969.

and one overhead projector. Teachers are encouraged to borrow films from either the ETV Department or the resource centre of the Teachers' Training College. At the TTC resource centre and at the Inspectorate's AVA Unit teachers may also use facilities and receive guidance on the production of such materials as photographs, charts and transparencies. Viewers of the ETV programmes include some 85 per cent of primary and secondary school pupils.

Since July 1972, the new principal of TTC introduced two special education electives into the curriculum for students — one on 'programmed instruction and learning', and the other on 'ETV script writing'. This ensures that creative work will continue through the involvement of trained, informed and able teachers.

Concerning educational research, it was important from the start to obtain the services of those who had not only had some training abroad, but had thought through local problems and issues and were sensitive enough to select the right problems for attention. It may be argued that a researcher should be allowed freedom to develop his own interests, but in view of the objectives specified, the Research Unit had necessarily to consider the implications of research for national development, and to limit certain of their individual interests.

To attune research workers to problems in the field, a staff seminar is held once a week or as often as the need arises to share and discuss issues. The work of the unit now covers the following areas: curriculum development; test development; manpower studies to assess the relevance of technical education courses to job requirements in the field; evaluation of on-going programmes; language studies; conduct of seminars and the publication of a bulletin for teachers.

Since the education of adults in general, and parents in particular, is viewed as having great importance in that it complements what goes on in schools, the ETV Department will be expanded to cover both school and adult education programmes. It will also include a media centre. The less routine aspects of the Ministry's Research Unit will soon be the responsibility of the new Institute of Education, which will not only develop as a centre for teacher education of all types and levels, but will become an educational research centre as well.

The Extra-Curricular Activities Centre has impressive figures regarding the growth and extension of activities. In 1972 Singapore was able to send a large South East Asian Peninsula Games contingent of school boys and girls who were responsible for a significant proportion of the medals won by Singapore. By 1971, there were 135 cadet corps units in 102 secondary schools and 283 police cadet corps units in 110 secondary schools, as well as scouting and guiding movements, Red Cross and Boys/Girls Life Brigade activities. Most impressive has been the increase in musical activities. Each school now possesses at least a brass band, a choir or a string orchestra.

The success of all these activities is due partly to the policy obligating school children to participate in certain extra-curricular activities and partly to the 'success begets success' phenomenon. Such activities have a definite advantage over other school activities in that children are actively engaged and have their reward almost directly. Also there is a great deal of encouragement from the Ministry of Education. For example, it arranges, through its ECA Centre, almost free tuition for would-be music pupils.

But, that educational technology and educational research have developed as rapidly as they have is due to opportune timing more than to any other factor. Where a need is felt, favourable public reception tends to be better assured.

VI. A concluding word

There are important lessons which may be learnt from the Singapore experience. Some have already been referred to but may bear repetition.

1. The goals and objectives of education have to be relatively stable, so that the development of the system can be consistently directed.

2. Innovation has also to be supported by stability of the political and social systems. If this obtains, the system is well braced to absorb the innovative effort, even when it is sometimes shockingly sudden.

3. There must be co-ordination to relate the different aspects of innovation so that every effort may have greater impact on the system.

4. Personal involvement at all levels is important and communication to and between people even more so. There are two categories of change agents who need to work together and share the same objectives. Both are important. There are the 'front-rankers' in the limelight who possess the energy to get things done; there are also the 'backroom boys' or 'kakitangan' ('hands and feet people' — Malay word) who tidy up in the wake of the drama. The latter tend to be forgotten and should be often encouraged.

5. The involvement of enthusiastic people may bring hazards in that they will brook no failure and strongly believe that evaluation will substantiate wishful thinking. While, in the context of desirable change, a little excess does no harm, there should be built into the system a method to curb experimental delirium and to induce a sober realism.

6. Objective evaluation is difficult and time consuming. If decision making were to rest solely on the results of objec-

tive evaluation, the system might grind to a halt. In reality, major decisions are often quick decisions and it is therefore important that as much relevant information as possible should be available to the decision maker. For this reason, there should be a good mix of administrators, operators and evluators working together at the planning stage before any innovation is launched.

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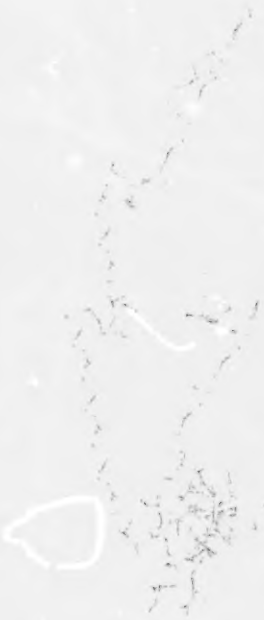

Questionnaire (9)

To develop the series further, it would be helpful if readers could record their impressions and inform the IBE. (Please write 'yes' or 'no' in the space following each question. Further comments may be written on the back of this sheet.)

1. Do you find the author's analysis useful for your own work? ☐ in particular, is it:
   - an adequate survey of the field? ☐
   - a basis for further discussion and study? ☐
   - too abstract to be useful? ☐

2. With regard to the sources cited, could you indicate any recent documents of a similar type which have been overlooked?

3. Can you indicate any cases of innovation in your own country (or field of specialization) which you feel might have interest for other countries if adequately written up? Please name the person or institution able to provide further information about the project.

Please indicate your name and address and return this questionnaire to: the International Bureau of Education, Palais Wilson, 1211 Geneva 14, Switzerland or, when applicable, to your Unesco Regional Office for Education (i.e. Bangkok, Dakar or Santiago).